TECHNOLOGY DEPT.

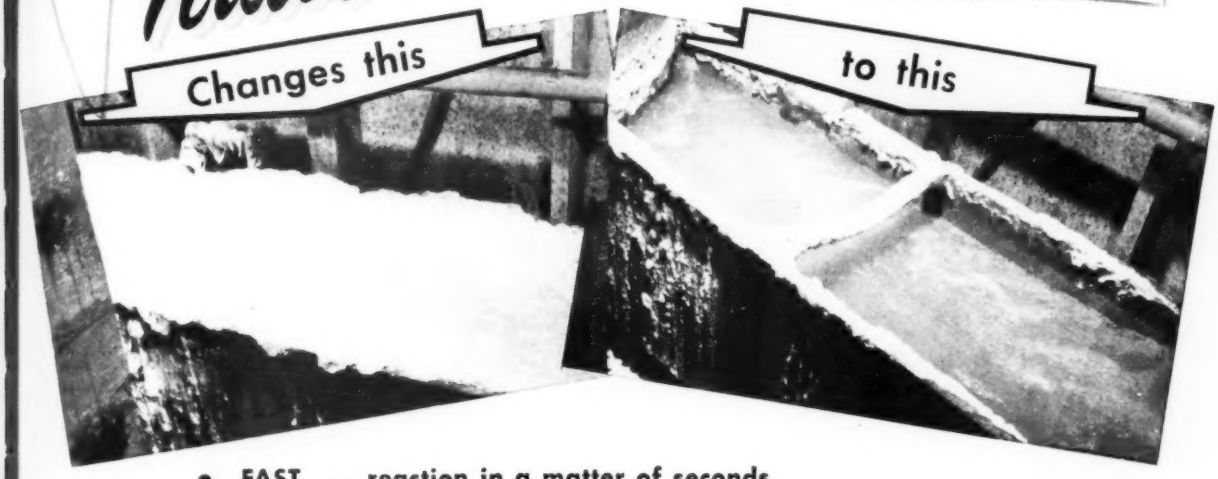
- Crossett's new hardwood pulp mill
- What coatings do for paper
- Automatic control of electrical load and frequency
- Noise reduction on the fourdrinier

The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

PAPER TECHNOLOGY LIBRARY

Nalco 71-B LIQUID ANTIFOAM

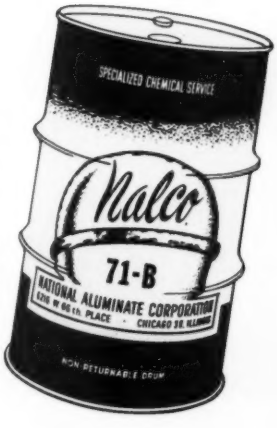


- FAST . . . reaction in a matter of seconds
- EFFECTIVE . . . as a defoamer—as an antifoam
- FAR MORE ECONOMICAL . . . than paste or briquette

Here is what happened when *liquid* Nalco 71-B was tried in a well-known mill plagued with the foaming problem of high-resin pulp.

At a cost of only *one-sixth as much* as the previous antifoam, the mill reported Nalco 71-B *eliminates all foam in seconds!* Sheet quality remains high, and production stoppages and slow-downs due to foaming have been eliminated. Fibre loss to sewers is extremely low and cleaning of cell room and screens has been substantially reduced. Small wonder the mill continues to use Nalco *liquid* 71-B in both primary and secondary pulp screen processes.

There is a whole series of Nalco antifoams designed to get *results* like this in your mill. Ask your Nalco Representative about them, or write direct to Nalco.



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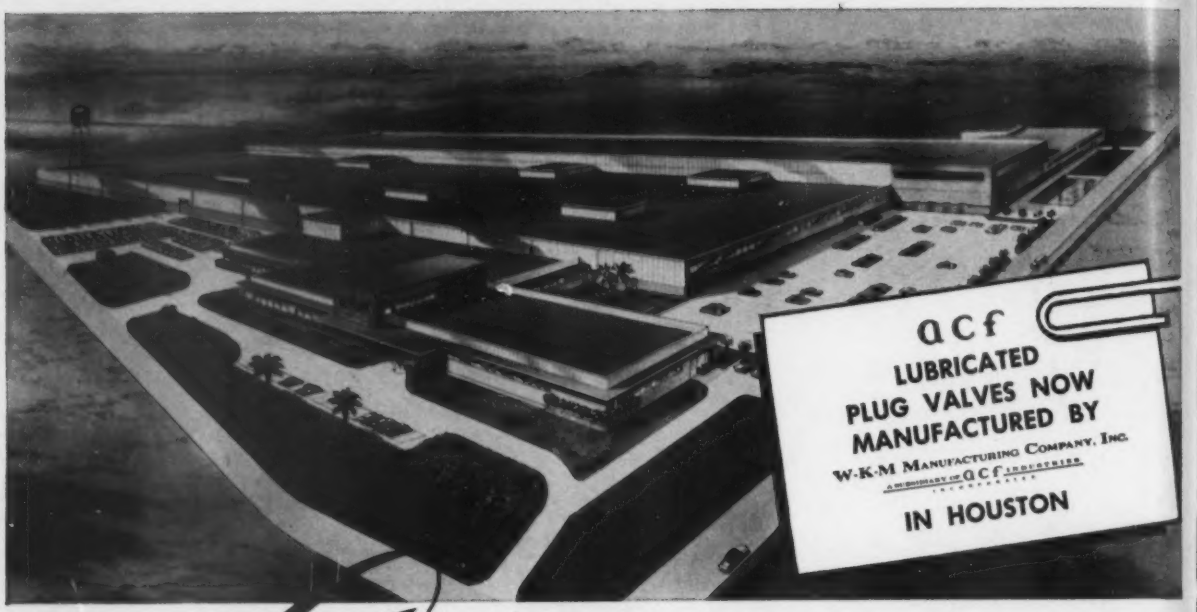

Announcing

TWO GREAT EVENTS FOR MAY 17TH

THE CONSOLIDATION OF THREE GREAT COMPANIES

acf Valve Division, W-K-M Manufacturing Company, Inc., and the Key Company — all members of the acf Industrial Family — have been brought together as W-K-M Manufacturing Company, a subsidiary of acf Industries, Incorporated.

Management, Manufacturing and Marketing facilities of all three are now centralized in this new 12-acre completely air-conditioned office and plant at Missouri City, Texas, a few miles west of Houston.

This consolidation provides important efficiencies of production of W-K-M Through-Conduit Valves, acf Lubricated Plug Valves, Key Return Bends, and Key-Kast Welding Fittings. These products, with a long established reputation for excellent service and performance, will continue to be engineered, manufactured and sold by the same experienced personnel who were instrumental in building that reputation.

OPENING OF A GREAT NEW PLANT THURSDAY, MAY 17TH TWO to SEVEN P. M.

You are cordially invited to inspect our new Plant and Office at Missouri City, Texas, just a few miles west of Houston.

Special transportation from downtown Houston to the plant will be provided for visitors. Please write immediately for your Transportation Pass. Address W-K-M Manufacturing Company, Guest Committee, P. O. Box 2117, Houston, Texas.

W-K-M MANUFACTURING COMPANY, INC.

A SUBSIDIARY OF acf INDUSTRIES INCORPORATED

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MANUFACTURING

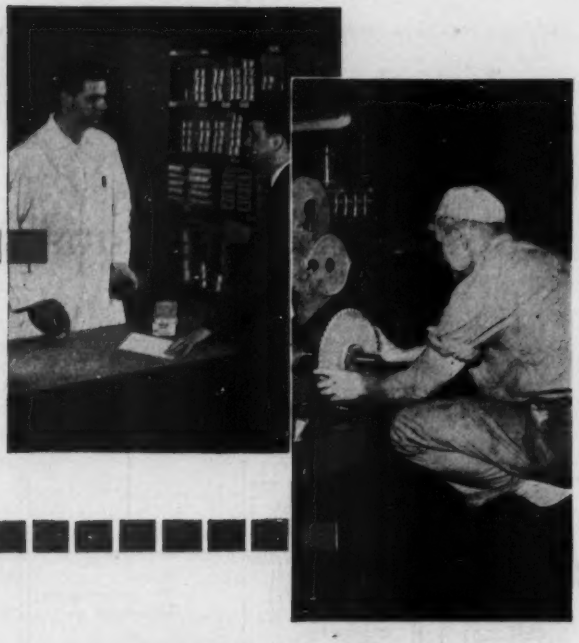
W-K-M THROUGH-CONDUIT GATE VALVES

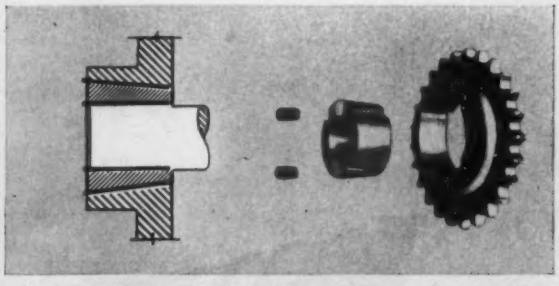
acf LUBRICATED PLUG VALVES

KEY RETURN BENDS AND FITTINGS

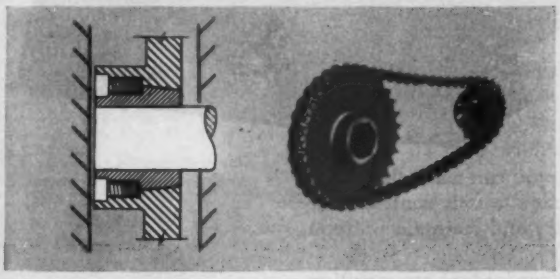
ORDERED today

OPERATING today

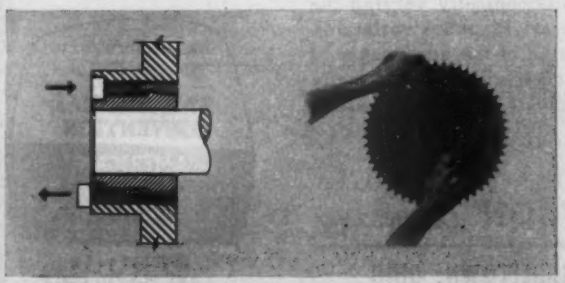




FULL BEARING . . . POSITIVE GRIP. Contact extends the entire length between bushing and shaft, sprocket and bushing. Uniform compression on shaft provided by tapered construction.



SAFE AND COMPACT. Flush mounting requires minimum shaft space and bushing requires no more length than sprocket hub. No projecting flanges or bolts—all cap screws are fully recessed.



EASY TO INSTALL AND REMOVE. Setscrews force and hold bushing in tapered bore of sprocket, clamp it tightly onto shaft. Turning setscrew in removal hole quickly releases bushing.

LINK-BELT roller chain taper lock sprockets require no reboring or other machining

HERE's the simplest, most economical method of installing roller chain sprockets. Link-Belt roller chain taper lock sprockets are available for immediate delivery in every industrial area, in sizes from ½ to 2-in. pitch. Bushings are stocked in bore increments of 1/16 in. for shaft sizes from ½ to 4-in. diameters. No delay for sprockets to be rebored.

Teeth are precision cut in conformance with ASA standards, accurately spaced for smooth chain action. Uniform, true tooth surfaces provide full contact with chain rollers, assuring maximum operating life.

Your source is the Link-Belt factory branch store or authorized stock-carrying distributor. Be sure to ask for new Book 2649 listing all available stock sizes.

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15,547

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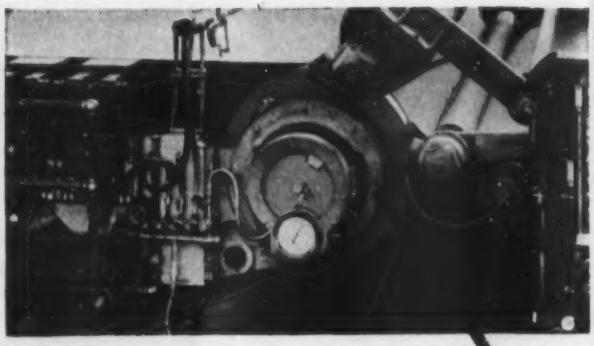
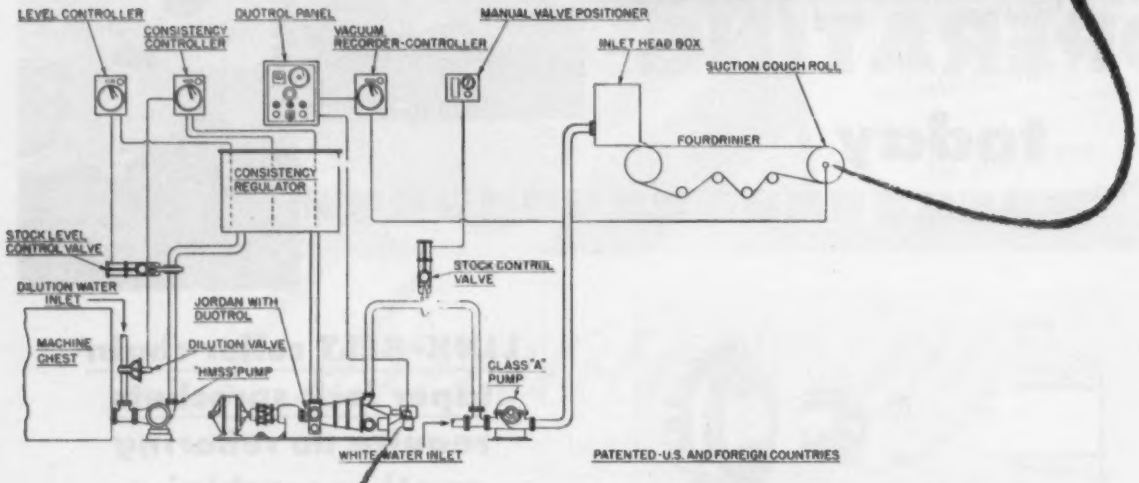
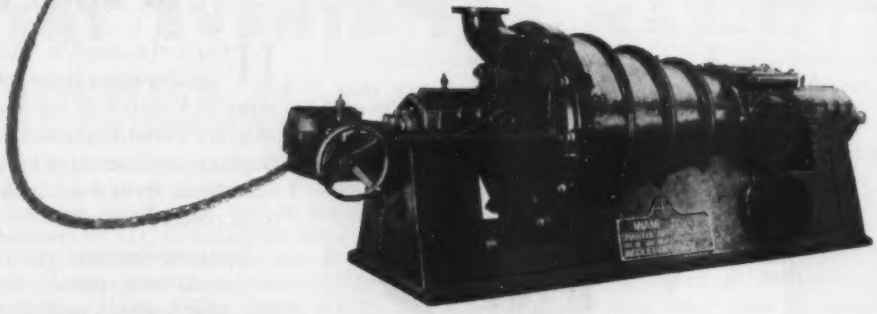
Let the Formation on the Wire Control Your Jordans







With this Black-Clawson system you can make the variations of the vacuum at the suction couch control your jordan plug settings automatically and maintain uniform stock treatment.

Duotrol* plug adjusters on your jordans are sensitive to changes in the vacuum caused by variations in fibre length and freeness of the stock being formed on the wire. The Duotrol units respond by automatically varying the jordan plug settings to compensate for these variations.

You can get a full explanation of the advantages of this system which is being successfully used in many mills. Contact the Shartle Division. *Trademark

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Technology • Engineering • Management • Production

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MEAD GIVES YOU RESEARCH TO IMPROVE PULPS

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MEAD *pulp*

From our point of view . . .

Greatly intensified forestry programs needed

The opening of the new hardwood pulp mill at Crossett, Ark., described in this issue, is in line with a national trend toward the full utilization of hardwoods in pulp production and also with the adoption of more rational forestry practices. As explained by S. V. Sihvonen, manager of Crossett's forestry division — which employs 26 additional professional foresters to implement the company's forestry program — the cutting of hardwoods on the company's 548,000-acre forest area will help round out a utilization of all growing timber and will put an end to the gradual encroachment of low quality growth in this area.

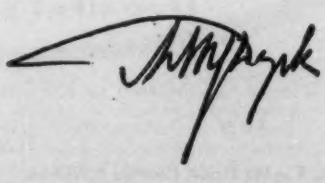
While the development at Crossett exemplifies a national trend also shown by reforestation and scientific forest management programs instituted by many pulp and paper firms — as well as by the tree farm projects, this trend will have to be intensified to meet the requirements of a rapidly growing industry and a mushrooming civilization.

Making an estimate of a so-called "upper level demand" for timber in the year 2000, the Forest Service of the U. S. Department of Agriculture has put the level of needed national forest growth at 105 billion bd. ft. in contrast to our present 47 billion bd. ft.

The Forest Service further estimates that, if by the year 2000 we were to apply to all our woodlands the same intensity of forestry now practiced on the nation's best managed forest areas, the attainable national growth would amount to 100 billion bd. ft.

We have no doubt that the timber consumption in the year 2000 will be on an "upper level demand" or an even higher level demand basis, because the "upper level demand" as derived by the Forest Service implies about the same future per capita consumption of industrial wood as we have today. What is needed therefore is a greatly intensified forestry program to achieve the over-all forest growth of 105 billion bd. ft. during the next 50 years.

Man has been endowed with the ingenuity and resourcefulness he requires to meet any challenge that is likely to confront him. He has successfully met a multitude of challenges in the past. He will solve the problem of the continuously increasing demand for pulpwood supplies once he recognizes it as a real challenge to his ingenuity and intelligence. Since the problem involves a long-range effect, the time to recognize it as a real challenge is now.



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Pulpwood Digestion Problems Discussed

CONTINUING the PI survey of problems facing the various phases of pulp and paper manufacturing and distribution, THE PAPER INDUSTRY has this month contacted several leaders in the field of pulpwood digestion.

Representative replies are presented here. The questions asked of these men were:

1. **What are some of your main problems in pulpwood digestion?**
2. **What are your views about introducing continuous pulping operations?**

O. B. Mason, Division Manager
The Mead Corp., Chillicothe Div.

(1) An annoying day-to-day problem in the digester room is to keep blow valves from leaking. On a longer range basis, digester corrosion is certainly a challenge. The most basic problems facing the entire pulping industry, however, are those related to stream and air pollution. We must learn how to prevent "that paper mill smell."

(2) It is difficult to control odors in a batch operation. This may be one of the factors that will lead to a greater concentration of research in continuous pulping. We will have to solve many difficult practical problems, however, before conventional batch operations are supplanted for the production of grades other than semichemical.

E. K. Scholz, Pulp Mill Superintendent
West Virginia Pulp & Paper Co., Covington, Va.

(1) Within our established processes, sulfate and neutral sulfite semichemical, the main problem is uniformity of product. This problem obviously embraces wood procurement and handling, liquor preparation and, in the digesting operation itself, the control of many variables constituting a "cook." If pulp can be made uniform in all properties from day to day, from cook to cook and within the digester itself, greater efficiencies of subsequent treatments could be realized because of the confidence that would be established in the material.

Considering the over-all picture of using wood and converting it to a papermaking material, the main problem is developing a new process or modifying old processes to realize greater yield and/or higher quality pulp from our major natural resource.

(2) In our mill we are using continuous cooking methods for manufacturing pulp for corrugating medium, and they have proven very satisfactory. I understand that continuous kraft cooking has been developed to a successful point. From the standpoint of the tactical problem of uniformity, continuous methods certainly have a bright future, and I feel that when the present new digester installations arrive at the time of replacement, continuous pulping schemes will have proven efficient to the point where they will constitute the only cooking method under consideration.

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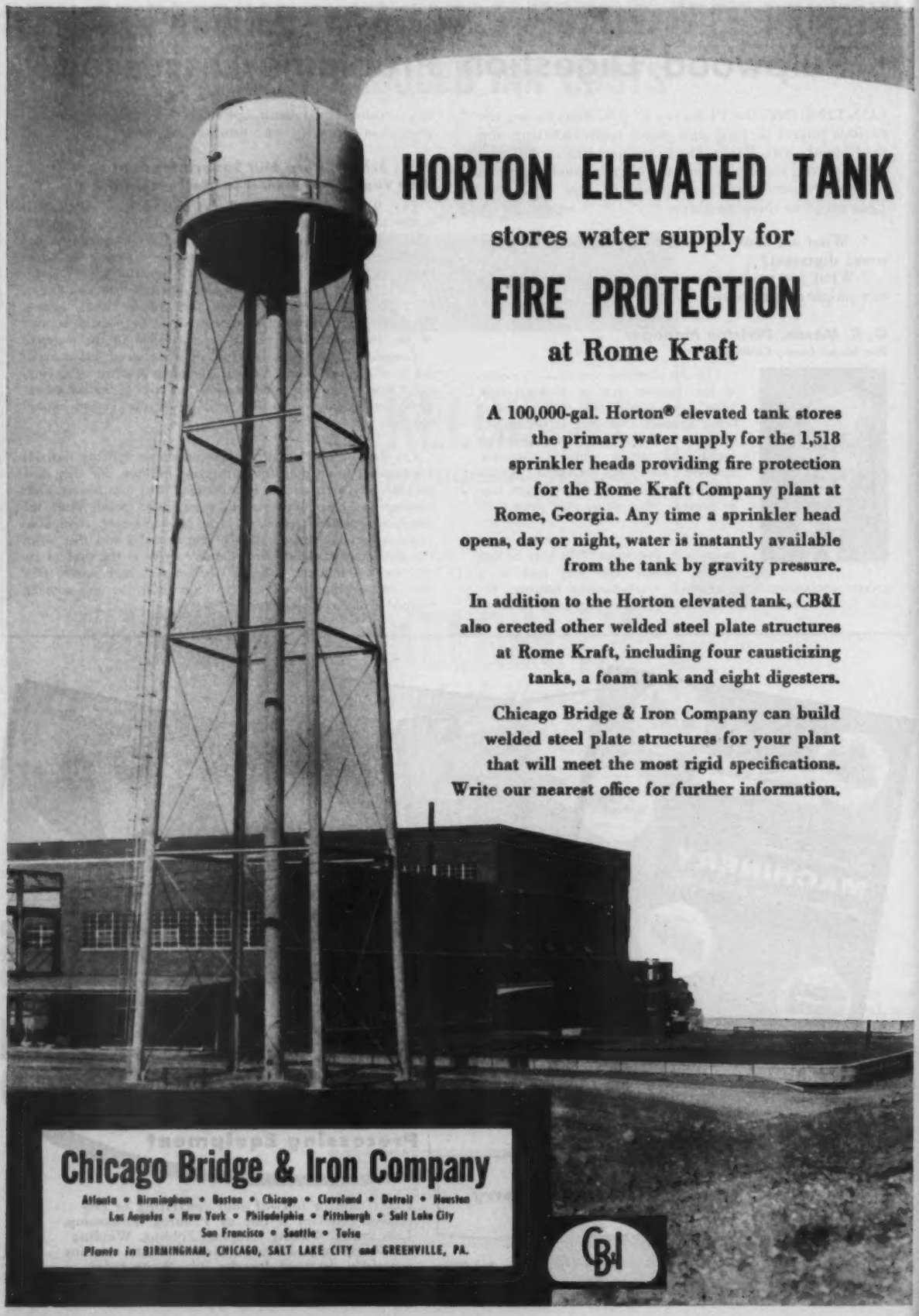

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stores water supply for

FIRE PROTECTION

at Rome Kraft

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In addition to the Horton elevated tank, CB&I also erected other welded steel plate structures at Rome Kraft, including four causticizing tanks, a foam tank and eight digesters.

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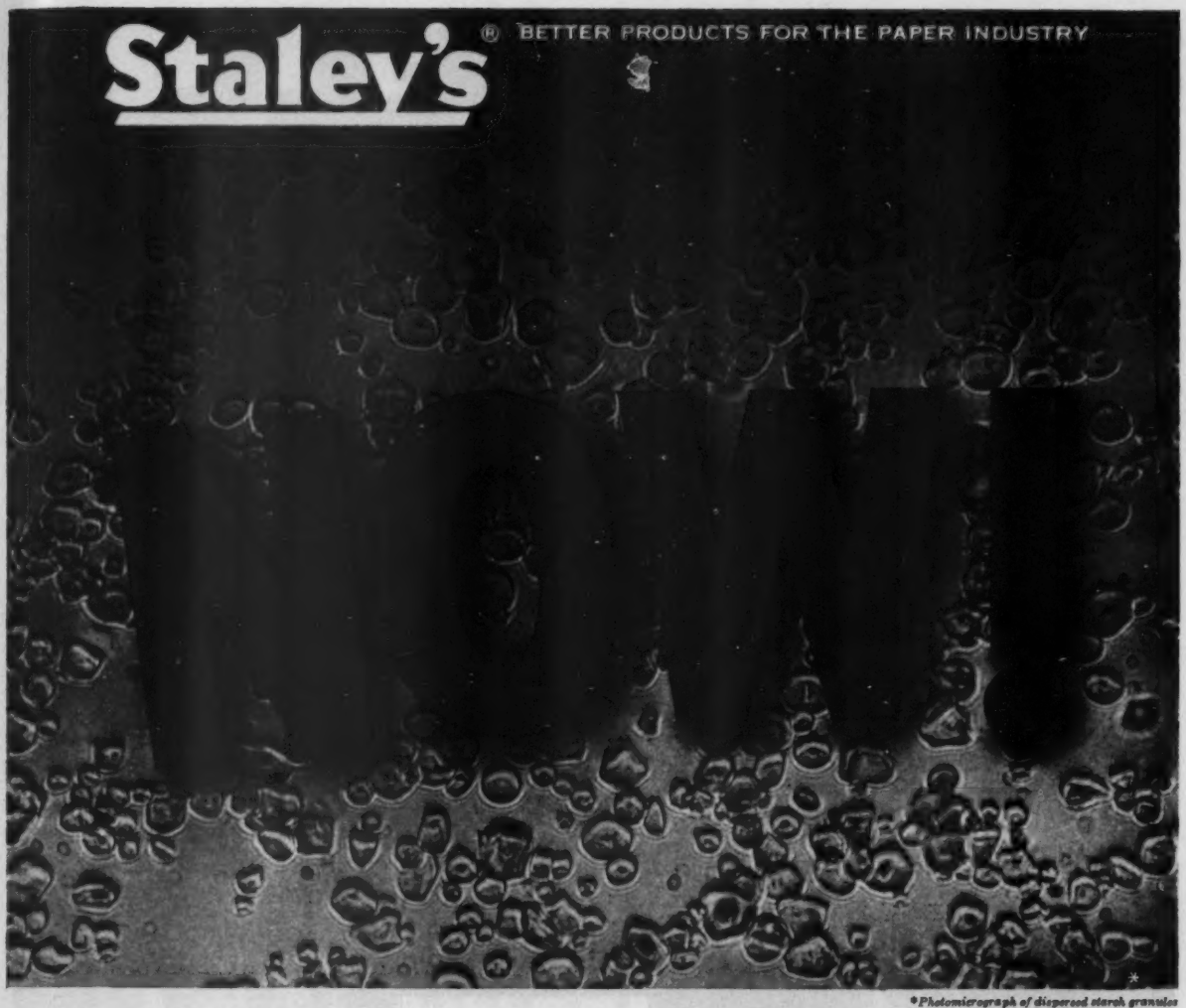

*Photomicrograph of dispersed starch granules

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NEW! **STACOLLOID® Gums**—A brand new family of starches . . . exceptional non-congealing properties, outstanding viscosity stability, excellent film-forming properties and clarity of solution. Available in a complete range of viscosities at different levels of chemical substitution.

NEW! **ETHYLEX Gums**—Etherified starches in a wide range of viscosities at various levels of chemical substitution . . . non-congealing, stable viscosity, excellent film-forming properties, clear cooking solutions with minimum tendency to retrograde on cooling.

NEW! **STADEX® Dextrins**—White, Canary, and British Gums—tailor-made for exacting requirements. A new concept in degree of uniformity and minimum color.

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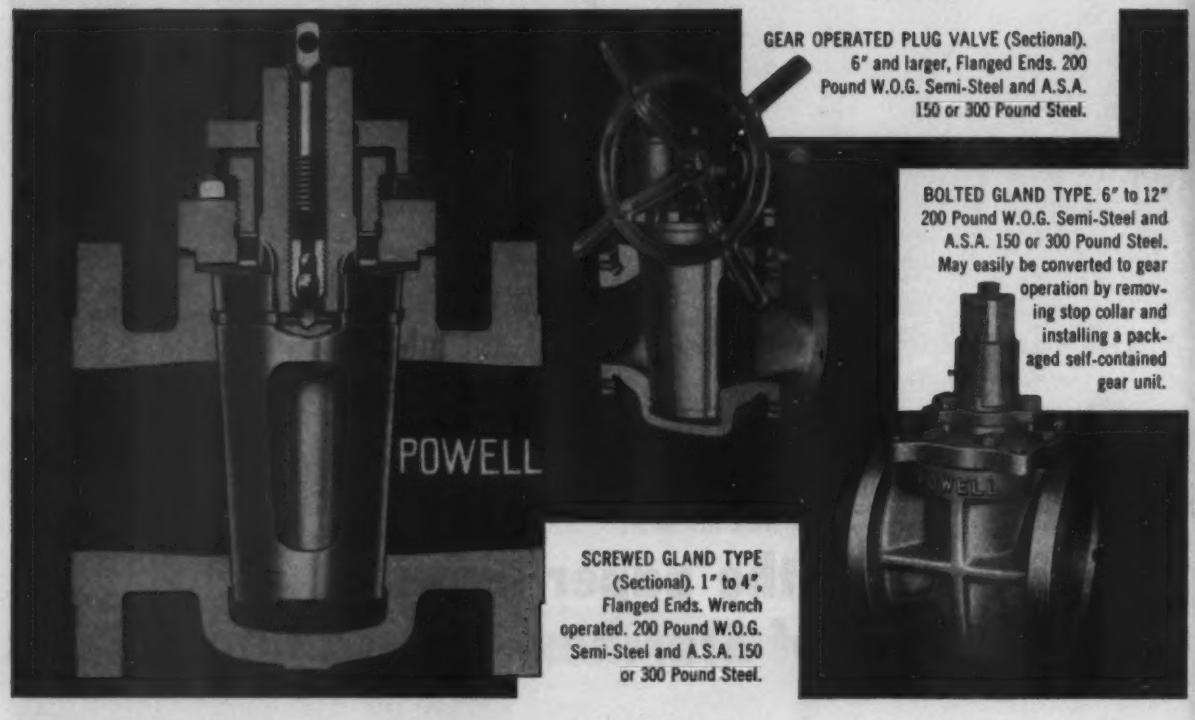

GEAR OPERATED PLUG VALVE (Sectional). 6" and larger, Flanged Ends. 200 Pound W.O.G. Semi-Steel and A.S.A. 150 or 300 Pound Steel.

BOLTED GLAND TYPE. 6" to 12" 200 Pound W.O.G. Semi-Steel and A.S.A. 150 or 300 Pound Steel. May easily be converted to gear operation by removing stop collar and installing a packaged self-contained gear unit.

SCREWED GLAND TYPE (Sectional). 1" to 4", Flanged Ends. Wrench operated. 200 Pound W.O.G. Semi-Steel and A.S.A. 150 or 300 Pound Steel.

Powell Lubricated Plug Valves maintain our 110-year tradition of quality and precision. Only the finest available materials are used. And painstaking quality control is rigidly enforced through each and every step of manufacture.

Features include quick and positive operation—just a quarter-turn to open or close. Lubricant grooves surrounding each port provide a positive seal when the valve is closed. In an open position, seating surfaces are not exposed.

Valve users who want one source of supply for lubricated plug as well as all types of bronze, iron, steel and corrosion-resistant valves will want full details on Powell Lubricated Plug Valves.

Available in Steel and Semi-Steel through distributors in principal cities. If none is located near you—or if you need help on valve problems—write direct to

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BRONZE, IRON, STEEL AND CORROSION-RESISTANT VALVES

The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR

The source of supply for all valve needs!

Papermakers find *New* Huyck Felts help eliminate marking . . . making possible vastly improved finish.

New Huyck felts go a long way toward helping Mill Superintendents meet the growing demand for *better finish.*

Huyck has pioneered *new* felt designs and manufacturing methods which help eliminate marking . . . making possible vastly improved finish. One of the major problems—solved by Huyck—was finding a way to put more toughness into the finest of yarns . . . *make them rugged enough to take plenty of stress and strain—yet smooth enough to prevent marking.*

Other Huyck developments contributing to *better finish* involve the engineering of *new* weaving processes and chemical treatments, such as the now famous *4-D.*

These are but a few of the many advancements Huyck has made toward *improving finish.* Ask your Huyck Sales Engineer and Field Service Engineer about them.

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YARWAY DIGESTER BLOW VALVES with AUTOMATIC LUBRICATION

One of a battery of Yarway Digester Blow Valves, motor-operated, with automatic lubricators, in a large Washington pulp mill.

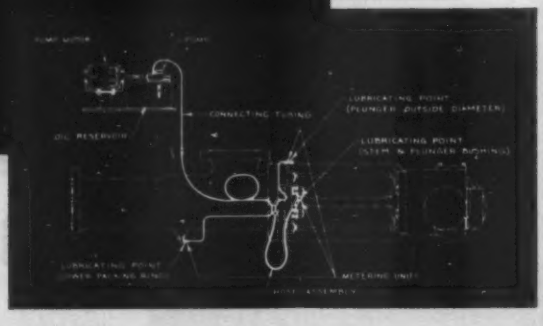

Diagram showing arrangement of Yarway Automatic Lubricator on Yarway Digester Blow Valve.

..help increase production, cut maintenance and save manpower

Automatic lubricators on Yarway Seatless Digester Blow Valves add new cost-saving and labor saving features to digester operation.

Push-button control of these valves also provides automatic lubrication of them at the *right* places . . . at the *right* time. Result—less maintenance, fewer production delays, release of manpower for other productive work.

Reports on low operating cost experiences from pulp mills using Yarway Digester Valves, are impressive, too. One large mill found the resultant *savings in operation and maintenance the first year more than paid for the cost of their new 4 Yarway Digester Valves.*

Yarway Seatless Digester Blow Valves are either motor or hydraulically operated. All are remote controlled—designed for clean, free discharge and tight shut-off.

For full information on Yarway Seatless Digester Blow Valves, write for Bulletin B-441. No obligation.

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THESE TOUGH PAPER MILL JOBS

without clogging or air binding!

3 TO 4% STOCK FROM CHEST TO REFINER

The size 6EL pump shown here was installed to replace a conventional stock pump and plunger pump combination, handling 3 to 4% sulfite, sulfate or soda pulp. Now the chest can be completely emptied without air binding and without having to resort to the plunger pump.

STOCK CONSISTENCY INCREASED FROM 2.4% TO 7%

Prior to the installation of this size 6EH pump, it was necessary to dilute the stock down to a consistency of 2.4% before it could be pumped from the storage chest to the beater. Now stock with a consistency of 7% is easily handled.

6% STOCK WITH 30% ENTRAINED AIR

This 1200 gpm pump handles 6% stock containing an estimated 30% entrained air. It was installed to replace a conventional stock pump on which frequent air binding difficulties and costly shut-downs were encountered. Now the stock flows freely and continuously, and air binding has been completely eliminated.

THE REMARKABLE and heretofore unattainable characteristics of the Ingersoll-Rand Class EL, EM and EH Stock Pumps are due to a patented design with unique *diverging* impeller construction. This makes them non-clogging, non-vapor-binding, self-venting and self-regulating under all conditions.

Available in capacities from 200 to 7000 gpm; heads 5 to 225 ft. For the complete story on this revolutionary new pump design, send today for Bulletin No. 7325.

10-318

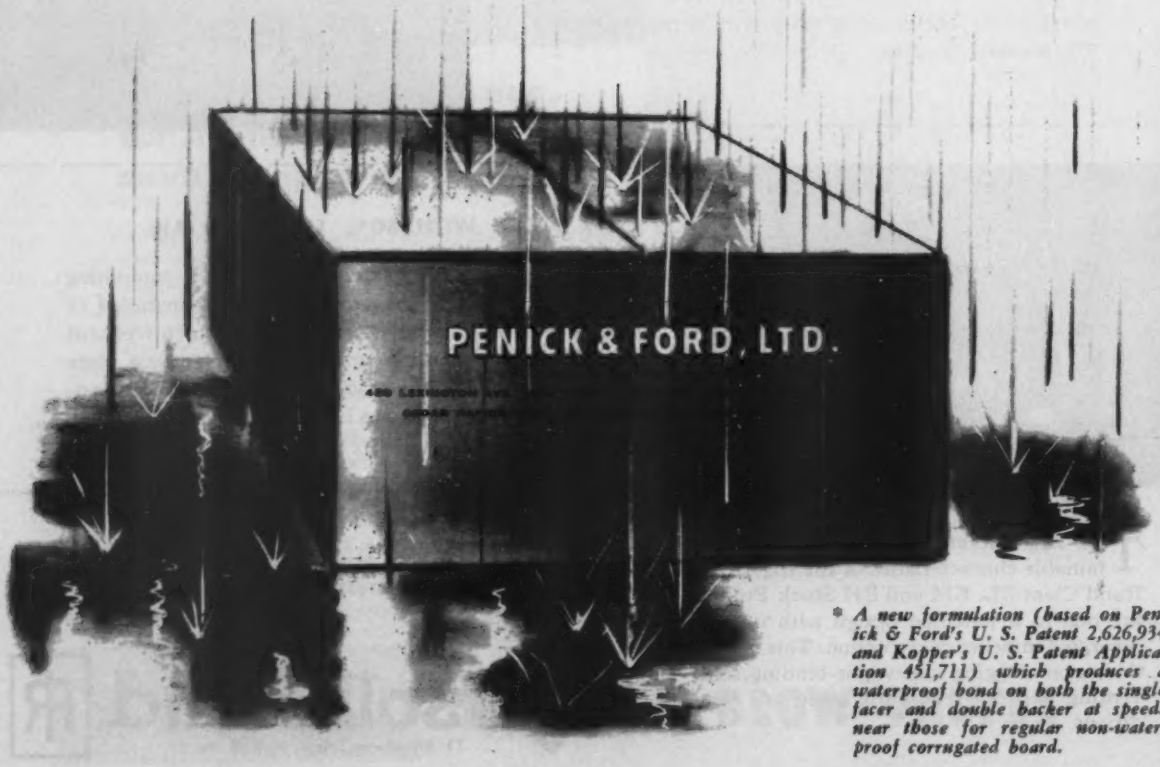
Ingersoll-Rand

11 Broadway, New York 4, N. Y.

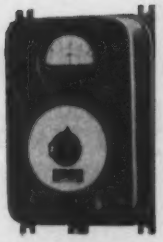
DOUGLAS WATERPROOF CORRUGATING ADHESIVE *7*

Resists Rain!

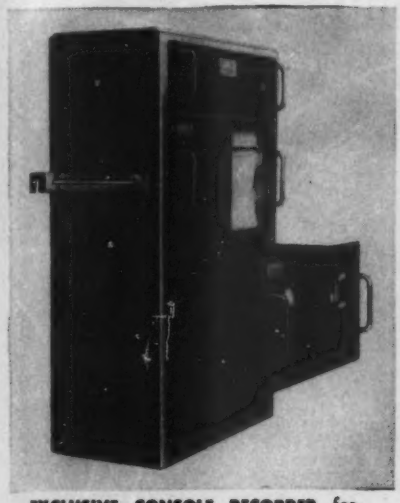
It is now possible for you to give your corrugated papers a
waterproof bond that won't deteriorate.
Here is a waterproof adhesive, free from objectionable odors,
that can be applied without washing up and flushing the tanks and lines . . .
the reaction is completed in a matter of minutes simply by the heat of the machine.
Now you'll be able to combine liners and mediums of all types and weights
(including corrugating medium impregnated with sulphur
and asphalt) at high speeds.
When you use DOUGLAS WATERPROOF CORRUGATING ADHESIVE No. 7,
you can meet JAN-P-108 delamination specifications on both sides.
Call on P & F Engineers to demonstrate this new,
economical waterproof adhesive on your corrugator.



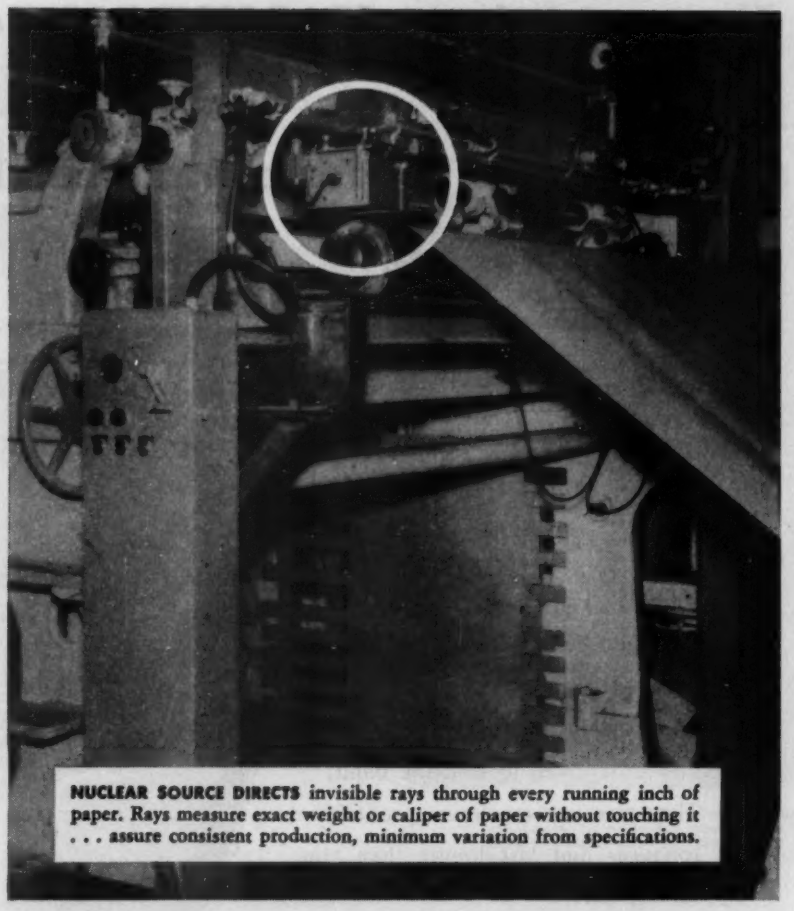
* *A new formulation (based on Penick & Ford's U. S. Patent 2,626,934 and Kopper's U. S. Patent Application 451,711) which produces a waterproof bond on both the single facer and double backer at speeds near those for regular non-waterproof corrugated board.*



MACHINE TENDER adjusts target selector to proper weight specification for each order. Selector acts as constant guide for tender stationed at wet end.

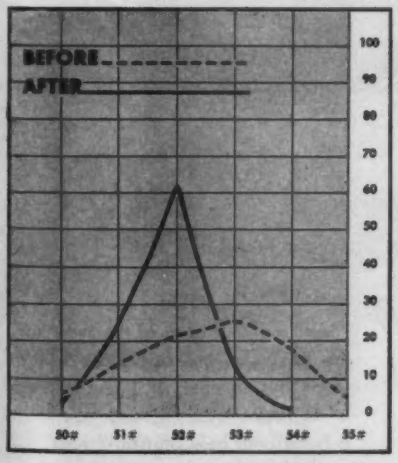


EXCLUSIVE CONSOLE RECORDER features drawer-type construction for easy maintenance. Continuous recorder charts weight of paper during production, provides permanent record.



NUCLEAR SOURCE DIRECTS invisible rays through every running inch of paper. Rays measure exact weight or caliper of paper without touching it . . . assure consistent production, minimum variation from specifications.

NOW . . . HUG WEIGHT SPECIFICATIONS with Curtiss-Wright Control Systems



BEFORE, when hand-weighed tear sheets were used for control, variation was excessive. After installing Curtiss-Wright system, uniformity sharply increased.

Field-proven Curtiss-Wright Basis Weight Control Systems monitor paper weight continuously, record actual production quality, warn immediately if variations occur—even trigger stuff gate controls. The result is roll after roll of on-weight paper, with important savings in production time, pulp and down-grading losses. Order changes can be made faster, and cross-sheet variation reduced as much as 50%. The large choice of mounting designs permits an installation tailored to your space requirements and budget. *For complete details, write Industrial Controls Dept., Curtiss-Wright Electronics Division, Carlstadt, N. J.*

WEST COAST REPRESENTATIVE:
Western Dynamics Co., 444 Dexter Horton Bldg., Seattle 4, Wash.

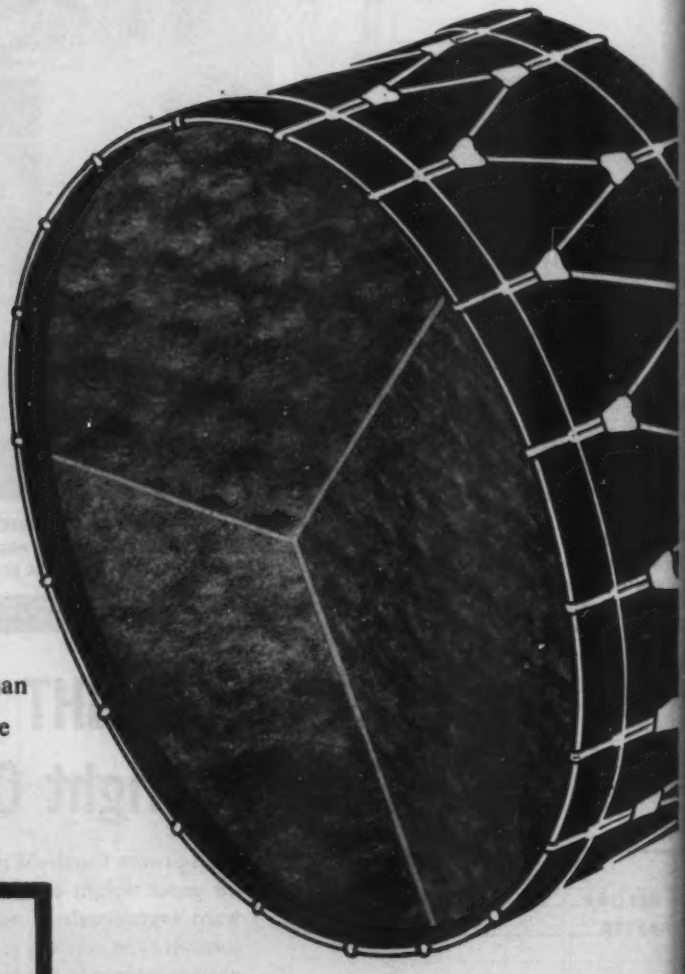
CANADIAN REPRESENTATIVE:
Electronics Associates, Ltd., 4616 Yonge St., Willowdale, Ont.

Systems Frieseke & Hoepfner

ELECTRONICS DIVISION
CURTISS-WRIGHT
CORPORATION • CARLSTADT, N. J.

You can't beat HAMILTON Felts . . .

for beating costly downtime!



They're easy to put on—fast! Hamilton Felts are made especially to fit. They reduce adjustment requirements, get your machines back into production to beat the band! They give you maximum profitable tonnage—and last longer than you think possible.

Ask *your* Hamilton Felt Service Salesman how to reduce downtime. His experience is available without cost or obligation.

Hamilton
FELTS

• *Win a New Stetson . . .*
Give "Ham" a New Hat!

• **Ham Feltz says:**
"Send me your idea of the type hat the best wet-end operators will wear this summer. If I can "wear it" in future ads, I'll send you a handsome new Stetson—your size, of course."

MIAMI WOOLEN MILLS
Established 1858

SHULER & BENNINGHOFEN, HAMILTON, OHIO

CHAIN BELT answers your wood handling problems...

BY GIVING YOU ONE SOURCE FOR ALL YOUR DRIVE CONVEYING OR ELEVATING NEEDS!

For the long haul, Rex Belt Conveyor Idlers and Chains carry barked pulp logs to the chipper. These conveyor components are big favorites because of their lasting qualities and low maintenance.

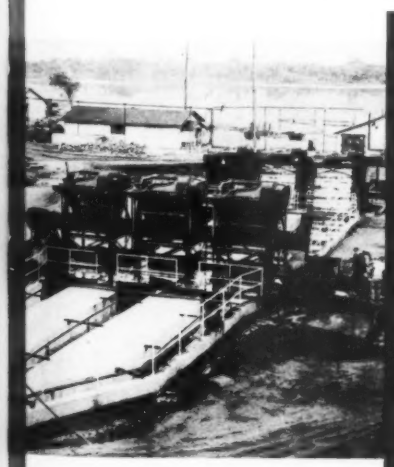
COMPLETE HANDLING SYSTEMS ...

Not only does CHAIN Belt make chains, belt idlers, bearings for your power transmission, conveying or elevating needs ... it also designs *complete* wood handling systems!

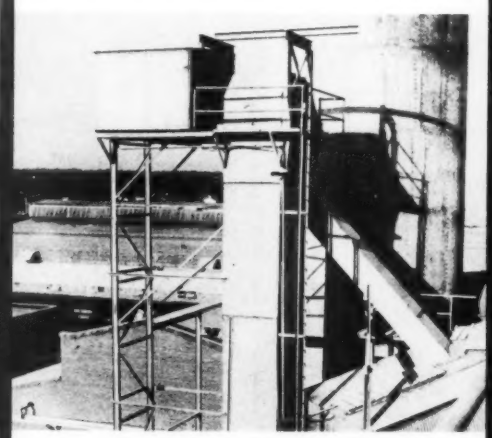
And why not? CHAIN Belt has over 50 years' experience supplying products and solving difficult materials handling problems for sawmills ... pulp mills ... softwood, hardwood, plywood plants ... and other forest products industries.

Shown here are but a few examples of handling systems that CHAIN Belt has designed or supplied components for — systems that have paid big dividends in time saved, increased capacity and lower costs.

This service of CHAIN Belt is at your disposal. It includes top-flight engineers, draftsmen and manufacturing facilities to handle every type of wood handling problem. This service may be able to help you improve your materials system — speed production, reduce costs. Consult your CHAIN Belt Company District Sales Office or send the coupon for further information.



Three chain and bucket grit collectors in this paper mill log handling flume prevent floating bark, dirt and other debris from clogging and damaging water pumps. These CHAIN Belt Grit Collectors save costly repair and maintenance to the pumps and keep the closed-circuit flume system working at top efficiency.



This Rex Wood Chip Elevator is especially designed for handling chips up to the top of the digestor or to the screens. Special steel buckets and a high-speed belt provide tremendous capacity — can be designed to handle from 12 to 15,000 cubic feet per hour! This unit assures smooth, steady flow of materials at minimum maintenance and operating cost. Another example of CHAIN Belt ability to solve economically your wood handling problems.

In the mill, this Rex Apron Conveyor is used for feeding barked logs to the grinders. It is 66 inches wide on 228-foot centers. The system has a capacity of 30 cords per hour. Teamed with company and consulting engineers, CHAIN Belt developed this system that has many new innovations to speed production, cut costs.

CHAIN BELT COMPANY

LEADERSHIP ... through creative engineering

For complete plant service, a full line of chains, bearings, idlers

CHAIN BELT has the answer to lower costs for every WOOD HANDLING job!

• Here, from the *complete* line of CHAIN Belt products you will find the answer to your power transmission, conveying or elevating problems. Not only will you find the exact chain, idler or bearing to fit your work — you will find the highest quality and dependability . . . quality built on over half a century's experience supplying the forest products industry.

Carefully selected metals . . . skillful hardening or heat-treatment . . . experienced workmanship and design . . . combine to produce the finest products — products that give you longer service, reduce down-time and cut maintenance costs. Whatever your wood handling problem, CHAIN Belt will give you the cost-cutting answers.

Rex H-Type Mill Chain — Most popular of all sawmill size chains for conveyor use. A tough, versatile chain with special wearing shoes for sliding.

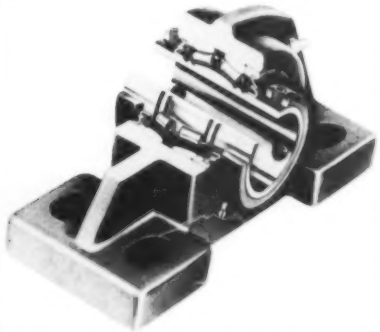
Rex H-Type Mill Conveyor Chains—Used for conveying slabs, chips, sawdust and refuse. Heavy, one-piece links with thick barrel provide long wear and good scraping action.

Rex Durobar and Combination Chains — A proven standard for wood handling service. Eccentric barrel of Durobar chain reduces wear on both chain and sprockets.

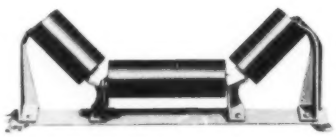
Rex Roller Drive Chain—The ultimate in high-speed drive chain. Highly flexible to withstand heavy shock loads. Precision-made for longest life. Available in single or multiple strands for a variety of drive uses.

Rex Roof-Top Transfer Chains — Primarily a green chain, but frequently found in sawmill transfer service. Choice of peaked or flat roof-top design. Flat roof generally used for handling finished lumber as it will not score.

Rex Chabelco Chains — For severe conveyor service, Rex Chabelco Chains are first choice. Available in both straight and offset side bar construction. Also special Chabelco Chains designed for log deck, log haul-up, trimmer, etc. service.



Shafer Self-Aligning Roller Bearings — These bearings combine the best advantages of the roller and the ball by using concave rollers operating between convex races. Their stamina and dependability have been proved under extreme load conditions found in the lumber and pulp industries. Their reserve capacity is your assurance of longest life and continuous peak performance.



Rex Style No. 46 Troughing Idler — Specially designed for handling wood chips. Concentrating rolls of the idler are sloped at 45° to provide exceptional carrying capacity. This feature permits loading of chips close to the belt edge without spillage and gives the belt additional carrying capacity when compared to the conventional 20° sloped idlers.

CHAIN Belt Company
Dept. FP-2
Milwaukee 1, Wisconsin

☐ Please send catalog on Rex products for the Forest Products Industry.

☐ I would like to discuss my wood handling problems with a CHAIN Belt District Sales Engineer.

Name.....

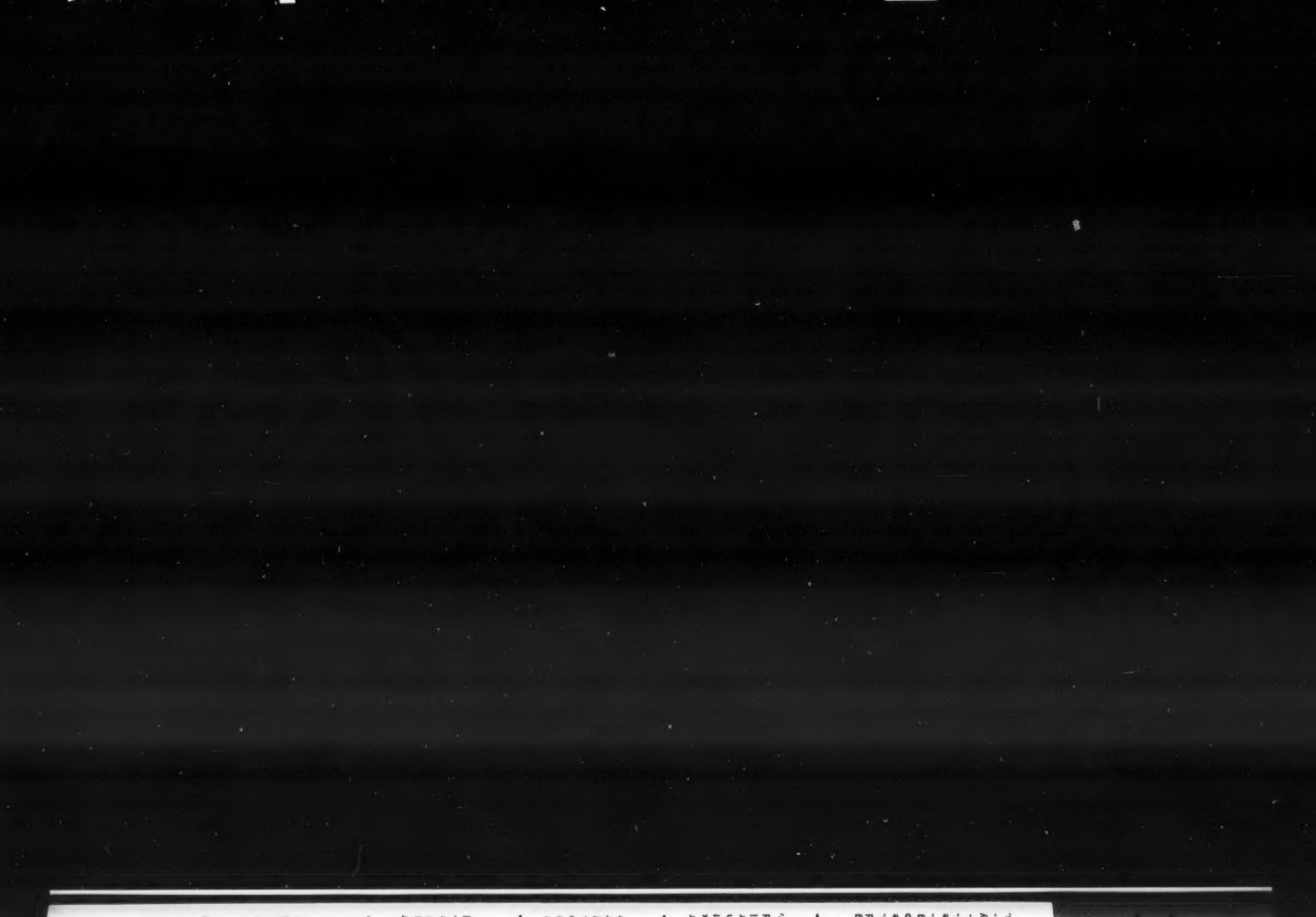
Company.....

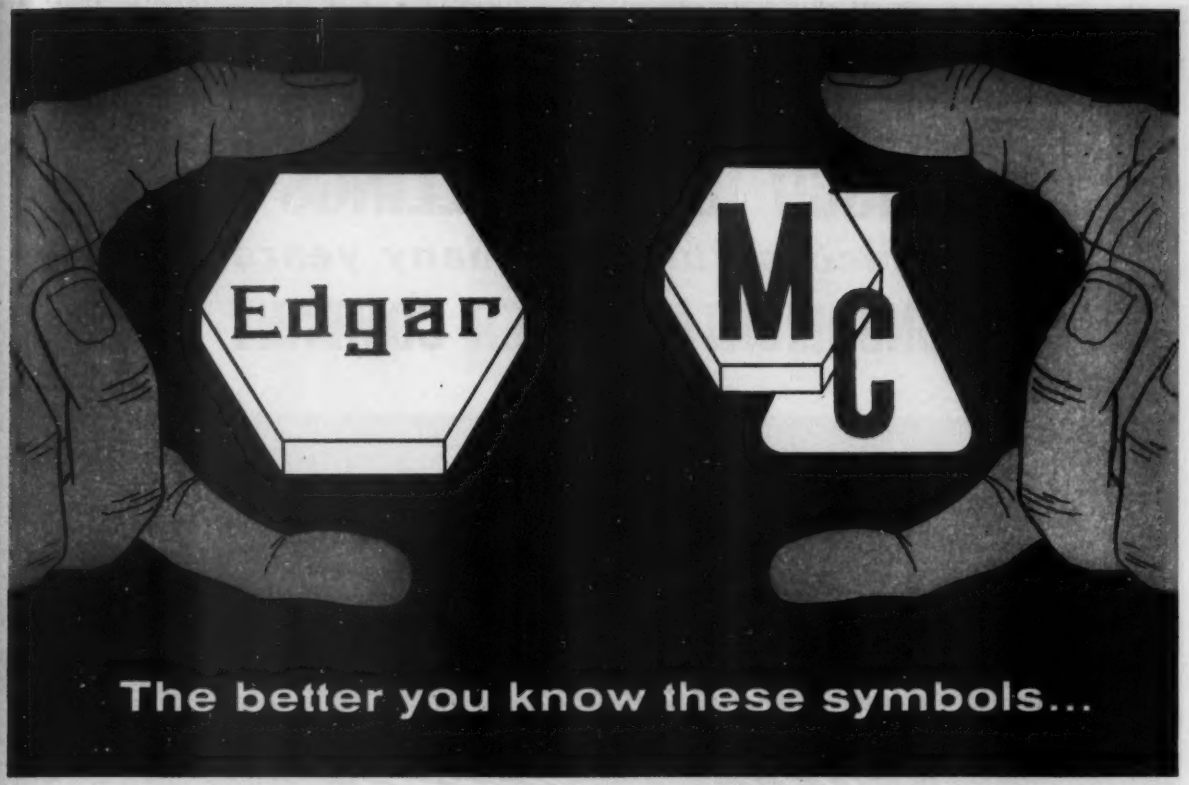
Address.....

City..... State.....

CHAIN BELT COMPANY

MILWAUKEE 1, WISCONSIN





the better paper you'll make

Edgar Clay specialists—at mines, plants and laboratories—make certain the signs you see above represent the *finest* paper clays modern technology can produce.

Unexcelled Uniformity . . . Consistent Quality are the important points that stand out in Edgar Coating and Filler Clays. High brightness, low moisture, minimum residue, controlled viscosity, plus *true uniformity*—all are unvaryingly yours every time, every car, year in, year out.

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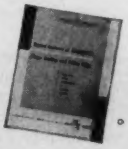
New Literature To Help You—"Typical Analyses of Edgar Paper Coating And Filling Clays" (basic properties of all coating and filler clays to aid your product selection). Free copies are yours for the asking. Use the coupon.



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Please send me, without obligation:

☐ "Basic Properties of Paper Clays"

☐ Other first-hand information and samples pertaining to:

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name _____ title _____

company _____

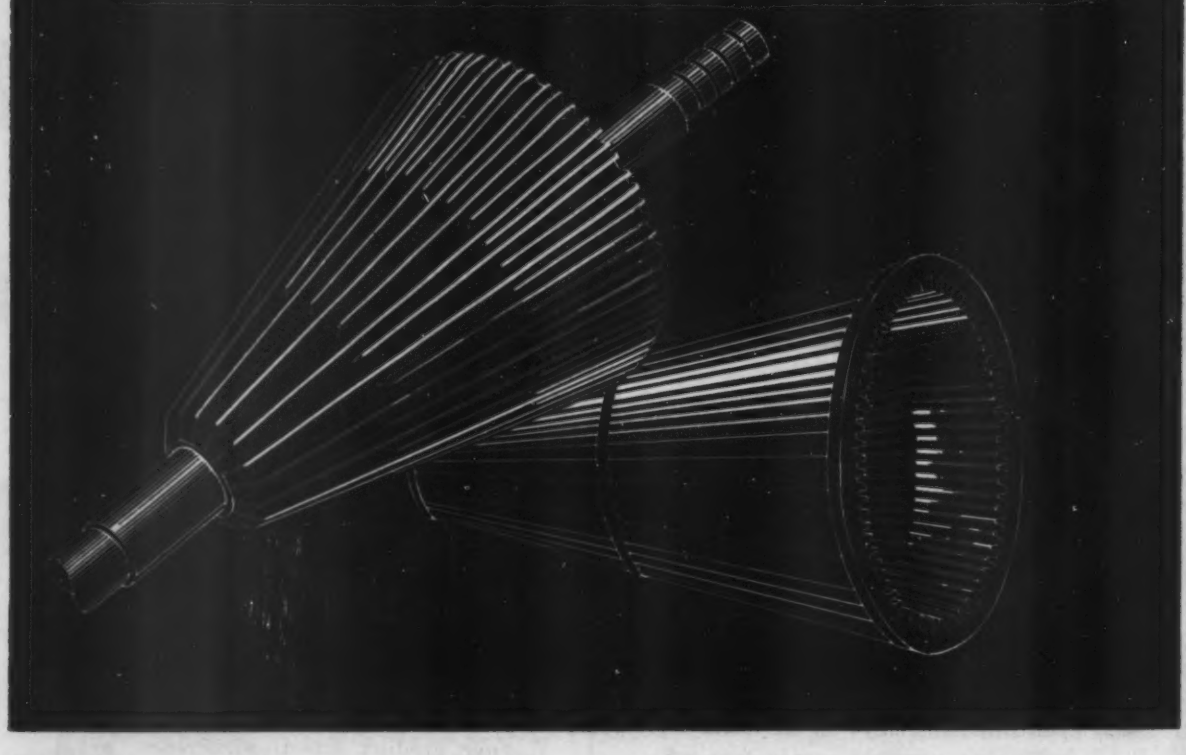
address _____

city _____ zone _____ state _____

TISCO JORDAN FILLINGS

-used successfully for many years by

CONSOLIDATED PAPER COMPANY



Consolidated Paper Company has used TISCO Manganese Steel Jordan Fillings for twenty-four years. In January, 1932, Superintendent Fritz Grunwald of Consolidated Paper's Monroe, Michigan Plant, placed his first order for TISCO Fillings. He's been doing it ever since, because TISCO Jordan Fillings give him trouble-free service and none has ever failed due to breakage.

Consolidated Paper Company's highly satisfactory experience with TISCO Manganese Steel Jordan Fillings is being continually duplicated in the mills of other prominent paper board, carton and felt manufacturers.

TISCO Jordan Fillings are machine finished inside and outside to correct dimensions for accurate fit and operational requirements—no "grinding-in" necessary. TISCO Fillings made of abrasion and shock resisting alloy steels, wear very slowly, providing unusually long periods of service between replacements.

TISCO Manganese Steel Jordan Fillings are made to fit all popular Jordan sizes. Ask us for full information.

Also TISCO Demountable Plug Sleeves, Beater Rolls, Bed Plates, Rag Slitters, Conveyor Chain, Barking Drum Chain, Log Haul Attachments, Sprockets, and miscellaneous castings to meet your own requirements.

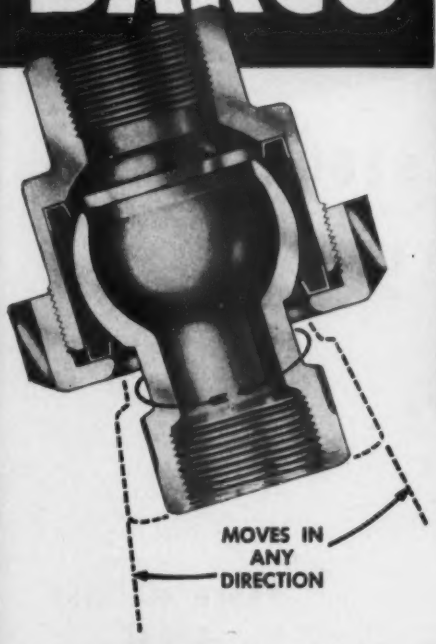
TAYLOR-WHARTON CO.

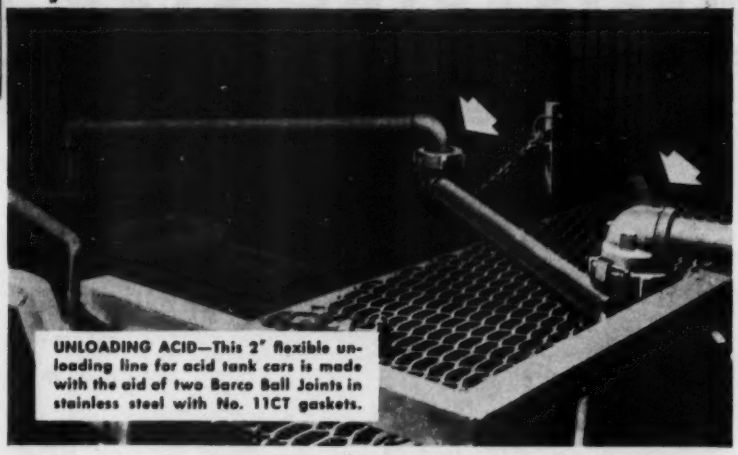
DIVISION OF HARSCO CORPORATION

HIGH BRIDGE 5, NEW JERSEY

Birmingham, Ala. Chicago, Ill. Cincinnati, O. Easton, Pa. New York, N.Y.

BARCO *Flexible* BALL JOINTS





UNLOADING ACID—This 2" flexible unloading line for acid tank cars is made with the aid of two Barco Ball Joints in stainless steel with No. 11CT gaskets.

... for handling

ACIDS • CAUSTIC SOLUTIONS BLEACH CHEMICALS

in Pulp and Paper Mills

Leading manufacturers of all kinds of chemicals used in pulp and paper mills recommend use of BARCO BALL JOINTS wherever you must provide for *flexibility* or *movement in piping.* Here's why:

Barco's *standard* malleable iron ball and casing offer good resistance to chemical action and corrosion. Where additional protection is desired, these parts can be supplied in stainless steel or virtually any alloy specified.

Barco's new No. 11CT gaskets are impervious to chemical action and maintain a tight seal without interfering with the easy turning action of the joint. No lubrication is required.

One Barco Ball Joint will do the work of two or more swivel joints because it *"moves in any direction."*

Barco Ball Joints can help you in many ways. Use them in your mill! Barco also makes revolving joints (for continuous higher speed rotation), swivel joints, and swing joints for other kinds of pipe movement. For complete information, write BARCO MANUFACTURING CO., 526-F Hough St., Barrington, Illinois

1. **NO METAL-TO-METAL CONTACT BETWEEN MOVING PARTS.**
   An important Barco advantage where corrosive chemicals are present, either externally or internally.
2. **CHEMICALLY INERT GASKETS.**
   Barco offers a choice of seven types of gaskets including No. 11CT for corrosive service. No lubrication required.
3. **STAINLESS STEEL.**
   Also regularly furnished in Malleable Iron, Steel, Bronze, and Aluminum. Other special alloy joints to order.
4. **MAXIMUM FLEXIBILITY.**
   Up to 40° side flexibility with 360° rotating movement.
5. **PRESSURE SAFE! FIRE-PROOF!**
   Unequalled for SAFETY where flexible connections are required.
6. **MANY STYLES AVAILABLE.**
   Angle or straight; threaded or flanged connections. For pressures to 7,500 psi; temperatures to 1000° F. 15 different sizes. ¼" to 12".

SEND FOR THIS BULLETIN No. 215

DIGESTER—4" Flanged Barco Malleable Iron Ball Joints with No. 11 gaskets give excellent service in connecting piping to slow revolving spherical digesters.

The SUTHERLAND BREAKER TRAP

DEFIBERING STAR PERFORMER

THAT GIVES AN INCREASED YIELD OF USABLE FIBERS...

A CLEANER SHEET

WASTE PAPER

PAPER MACHINE BROKE

BROWN STOCK DEFIBERING

WET STRENGTH PAPERS

The Sutherland Breaker Trap is the **only** machine specifically designed for **selective** defibering of paper pulp. This versatile machine is unique in principle, simple in operation, low in cost. It may well prove to be the answer to your defibering problem. Write today for full details.

SUTHERLAND

REFINER CORPORATION
TRENTON 3, NEW JERSEY

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Paper Mills

and allied industries

prefer

MURCO

HIGH SPEED MULTI-KNIFE

CHIPPERS

D. J. MURRAY MANUFACTURING CO

Manufacturers Since 1883

WAUSAU • WISCONSIN

Why this wide preference for MURCO Chippers—these mills know from operation experience that MURCO Chippers as designed today have incorporated into their design and construction the most desirable features for today's production requirements . . . MURCO Chippers are designed to produce better chips with less sawdust and fewer slivers, free from repairs, while at the same time having production records of 100 cords or more per hour . . . MURCO heavy design and construction reduces vibration, and because they are compact, MURCO Chippers require less floor space. The pulpmills and allied industries listed here are not a complete roll call of MURCO Chipper users—only those with 75" and larger diameter discs. Write today for the new MURCO Chipper booklet—the most complete story on chippers printed to date!

75" 10-knife, Left Hand — Rust Engineering Co., Pittsburgh, Pa.
75" 10-knife, Right Hand — Continental Syndicate, New York
75" 4-knife, Left Hand — Allison Lumber Co., Bellamy, Ala.
84" 8-knife, Left Hand — Minnesota & Ontario Paper Co., International Falls, Minn.
84" 10-knife, Left Hand — Badger Paper Mills, Peshtigo, Wis.
84" 10-knife, Left Hand — Allied Chemical Corp., Sunbury, Pa.
84" 10-knife, Left Hand — Munising Paper Co., Munising, Mich.
84" 5-knife, Left Hand — Wausau Paper Mills, Brokaw, Wis.
86" 8-knife, Right Hand — Potlatch Forests, Inc., Lewiston, Idaho
88" 10-knife, Left Hand — Thilmany Pulp & Paper Co., Kaukauna, Wis.
88" 10-knife, Left Hand — St. Regis Paper Co., Jacksonville, Fla.
88" 10-knife, Right Hand — St. Regis Paper Co., Jacksonville, Fla.
88" 10-knife, Left Hand — Riegel Paper Corp., Milford, N.J.
88" 10-knife, Right Hand—Rhinelander Paper Co., Rhinelander, Wis.
88" 10-knife, Left Hand—Rhinelander Paper Co., Rhinelander, Wis.
88" 10-knife, Left Hand — Penobscot Chemical Fibre Co., Great Works, Maine
88" 10-knife, Right Hand — Otsego Falls Paper Mills, Inc., Otsego, Mich.
88" 10-knife, (2) Right Hand — Nekoosa-Edwards Paper Co., Inc., Port Edwards, Wis.
88" 8-knife, Left Hand — Champion Paper & Fibre Co., Canton, N.C.
88" 10-knife, Right Hand — Champion Paper & Fibre Co., Canton, N.C.
88" 10-knife, Right Hand — Dexter Pulp & Paper Co., Jefferson City, N.Y.
88" 10-knife, Right Hand — Hoberg Paper Mills (Charmin), Green Bay, Wis.
88" 10-knife, Left Hand — Kansas City Star, Park Falls, Wis.
88" 10-knife, Left Hand — Mosinee Paper Mills, Mosinee, Wis.
90" 10-knife, Left Hand — Rome Kraft Co., Macon, Ga.
90" 10-knife, Left Hand — S. D. Warren Co., Cumberland Mills, Me.
90" 6-knife, Right Hand — Celulosa De Chihuahua S.A., Mexico
90" 10-knife, Left Hand — Watervliet Paper Co., Watervliet, Mich.
96" 10-knife, Left Hand — Hollingsworth & Whitney Div., Mobile, Ala.
96" 10-knife, Right Hand — Brunswick Pulp & Paper Co., Brunswick, Ga.
96" 10-knife, Left Hand — Brunswick Pulp & Paper, Co., Brunswick, Ga.
100" 10-knife (2), Left Hand — North Carolina Pulp Co., Plymouth, N.C.
102" 10-knife, Left Hand — East Texas Pulp & Paper Co., Evadale, Texas
104" 10-knife, Left Hand — St. Regis Paper Co., Jacksonville, Fla.
110" 10-knife, Left Hand — Rayonier, Inc., Jesup, Ga.
110" 10-knife, Left Hand — International Paper Co., Panama City, Fla.
110" 10-knife, Right Hand—International Paper Co., Natchez, Miss.
110" 10-knife, Left Hand — West Virginia Pulp & Paper Co., Charleston, S.C.
110" 10-knife, Left Hand — Union Bag Corp., Savannah, Ga.
110" 10-knife, Right Hand — Marathon Corp., Rothschild, Wis.
112" 10-knife, Left Hand — National Container Corp. of Virginia, Big Island, Va.
112" 10-knife, Left Hand — Riegel Carolina Corp., Acme, N.C.
112" 6-knife, Right Hand — Kingsford Chemical Co., Iron, Mountain, Mich.
120" 6-knife, Right Hand — Champion Paper & Fibre Co., Canton, N.C.
120" 4-knife, Left Hand — Weyerhaeuser Timber Co., Klamath Falls, Oregon
150" 8-knife, Right Hand — Rayonier, Inc., Port Angeles, Wash.

MURCO Chippers are made in 36", 42", 48", 52", 60", 64", 72", 75", 84", 88", 90", 96", 102", 112", 120" and

Rx Making sick wells . . . WELL!

First comes diagnosis. Before the cure the trouble must be known so that proper treatment may be prescribed.

Trained Layne research men, with the help of the latest and best in scientific equipment, find the trouble . . . determine the corrective measures . . . and experts go to work.

Successful? . . . One smaller Southern city saved the cost of a new well at a nominal cost. And that's just one success in a long line of sick wells that have been made well by Layne.

The nearest Layne associate company will be glad to discuss such problems with you—without obligation. It's another Layne service that proves it's always wise first to "ASK THE MAN FROM LAYNE" on any phase of water development or maintenance.

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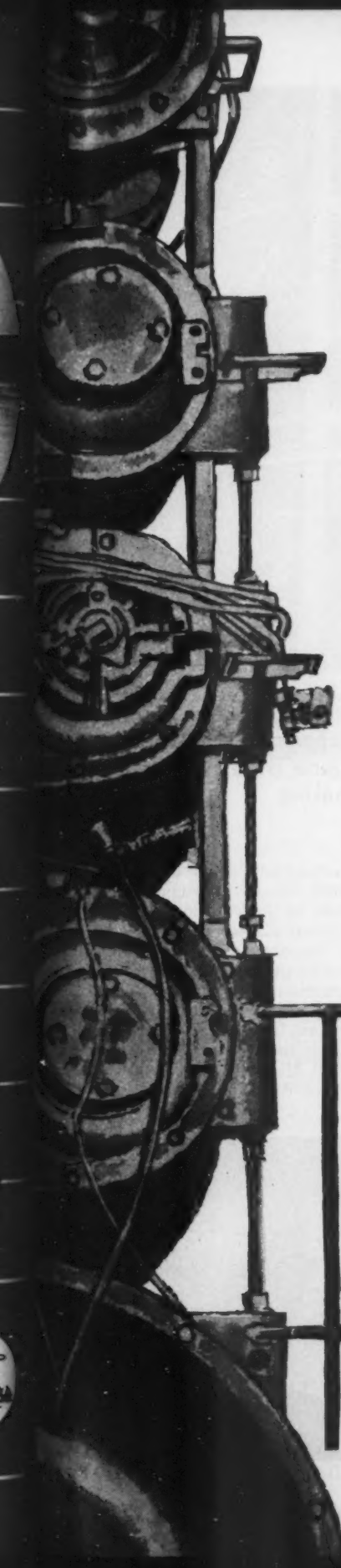
& BOWLER, INC.
MEMPHIS
General Offices and Factory

LAYNE ASSOCIATE COMPANIES THROUGHOUT THE WORLD

Layne

Water Wells · Vertical Turbine Pumps · Water Treatment



To the mill executive who decides on lubricants—

Three good reasons for specifying STANOIL Industrial Oil

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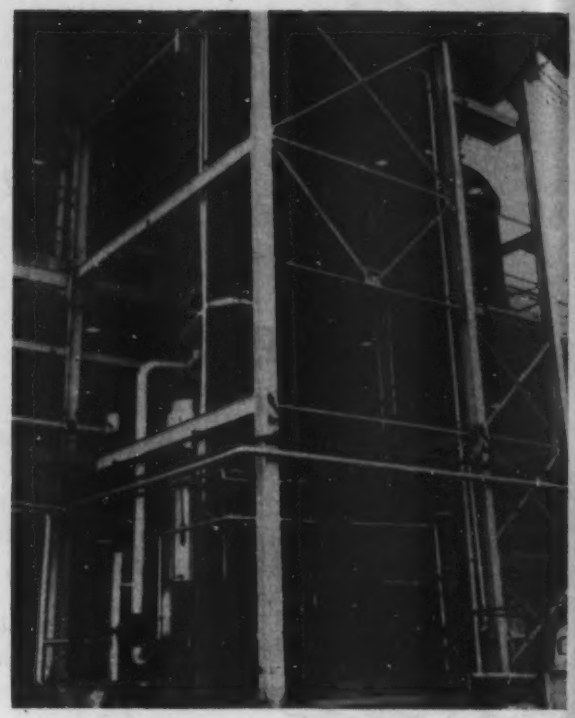
- **Stability**—STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention**—Inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts**—STANOIL has low pour point. Flows freely from cold start. No need for costly warm ups.
- **Resists Effects of Temperature Change**—STANOIL has high viscosity index, is resistant to temperature change. Lubricates in both high and low temperature service.
- **Has Excellent Demulsibility**—STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.

STANDARD OIL COMPANY
(Indiana)

STANDARD

Crossett's new bleached food board mill

Part I



The 3500-cu. ft. stainless clad digester made by Chicago Bridge & Iron. Its daily output is 70-80 tons of semichemical pulp

▶ Part I is a description of semichemical pulping. Part II, which will be published in the June issue, will deal with stock preparation and board making

WITH THE COMPLETION of Crossett Paper Mills' $16,000,000 expansion program, Mill No. 2, one of the most modern bleached board plants in the world and the first to use bleached neutral sulfite semichemical hardwood pulp in food board, has entered the production stage at Crossett, Ark. This expansion will have the result of establishing the Crossett Company as an important producer of food and packaging board, the national output of which has more than doubled during the last decade.

The mill is designed to use 30 per cent hardwood semichemical pulp and 70 per cent southern pine kraft pulp in the manufacture of food board. However, as P. F. Watzek, The Crossett Company president, stated, their research organization has shown that an even better quality board can be made from 50 per cent hardwood and 50 per cent softwood pulp. It is very likely therefore, depending of course on customer specifications, that the percentage of hardwood pulp used will in the future exceed the quantity specified in the mill design.

The utilization of hardwoods in the new mill will permit more intensive forestry practices on company woodlands, without which so-called low-quality trees have had the advantage in the past and have become progressively more abundant. The hardwood mill will enable the company to round out a program for the successful utilization of all its wood resources.

Unbleached kraft pulp is pumped from Mill No. 1 to the bleaching system of Mill No. 2, while hardwood pulp is made by the neutral sulfite semichemical (NSSC) method and fully bleached in Mill No. 2. A special feature of the new mill is the location of the whole pulping operation, i.e., cooking, refining, washing, and bleaching, on the same operating floor.

Mill No. 2 was designed and engineered by J. E. Sirrine Co.

Among Crossett's managing personnel who have contributed in the planning of the new mill and/or are responsible for the successful operation of this mill are: P. F. Watzek, president of The Crossett Co.; James C. Hair, manager of Crossett Paper Mills; Jack E. Meadows, assistant manager of Crossett Paper Mills; A. B. Moore Jr.,

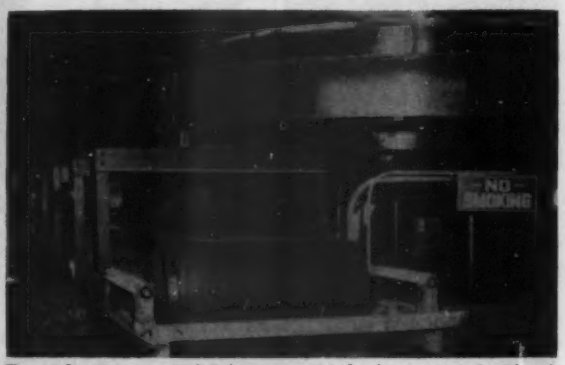
P. F. Watzek, President

J. C. Hair, Manager

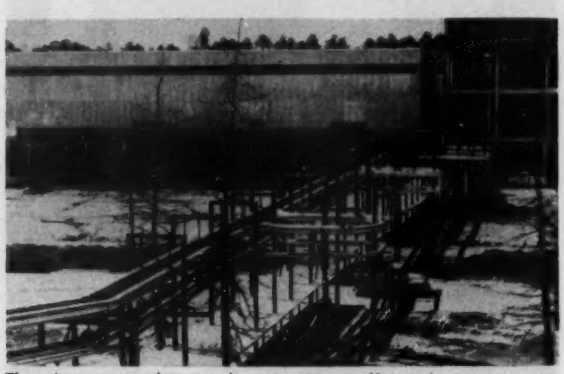
J. C. Meadows, Asst. Manager

Crawler crane operates in the wood yard of the semichemical pulp mill

Link-Belt log conveyor, Jeffrey chip conveying system and Stebbins chip silo



The 17-ft. diameter Link-Belt rotary disk feeder equipped with adjustable collar



The pipe system that supplies or returns sulfite pulp, steam, water and spent liquor

production manager of Mill No. 2; R. Q. Conner, plant engineer of Crossett Paper Mills; E. H. Smith, director of technical services of Crossett Paper Mills; C. H. Dunn, superintendent of the food board mill, and R. E. Collins, superintendent of the semichemical pulp mill.

J. C. Mulholland is sales manager of Crossett Paper Mills; S. V. Sihvonen is manager of the forestry division; K. G. Chesley is director of the research division; R. P. Meredith is personnel director, and R. Greenwood is director of public relations.

Wood yard and woodroom

Logs, consisting of gum, red oak, and white oak, are delivered to the wood yard in trucks and railroad cars.

The logs are then carried by conveyor to the 12×45-ft. barking drum equipped with adjustable gate. After the barked logs tumble over the gate into a conveyor, they are passed to a sorting table, where the imperfectly barked logs are rerouted to the barking drum and the cleanly peeled logs are discharged directly into the chipper.

The chipper is a four-knife machine which cuts $\frac{1}{8}$-in. thick and $\frac{1}{2}$ in. long chips. The chips discharge from the chipper to a rubber belt conveyor, which carries them to a rotating screen where sawdust and oversize chips are screened out. The latter are

Chemical area, including Olin Mathieson ClO_2 generator

Paul blow valve and Electric Steel heat exchanger

A. B. Moore Jr.

R. O. Conner

C. H. Dunn

R. E. Collins

E. H. Smith

S. V. Sihvonen

Impco 75-hp blow tank agitator

Bauer Bros. stainless steel drainer conveyor

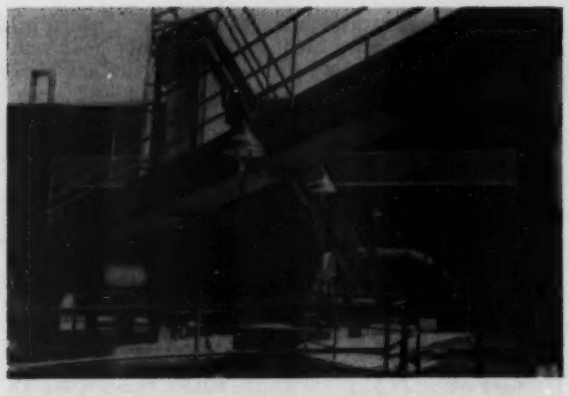
Impco centrifugal screens

Impco 11½ x 16-ft. bleach and brown stock washers

Chlorination washer with rubber-covered sectional hood

View of Type 123 circulator in chlorine dioxide tower

Impco single-shaft Hastelloy "C" high-density chlorine dioxide mixer



Bleached stock conveying system designed by J. E. Sirrine and made by Birmingham Fabricating

reduced to size in a 36-in. 30-hp crusher and then returned to the screen. The accepted chips then go to a 228-ft. long rubber belt conveyor which discharges into a 27× 59-ft. high tile silo. The silo is equipped with a rotary disc feeder which discharges chips through a chute to a 292-ft. long rubber belt conveyor feeding the digester.

An unusual feature of the rotary disc feeder is the adjustable collar at the bottom of the metal silo. Its up-and-down movement controls the angle of repose of the chips on the rotary plate, which operates at a speed of 5.2 rpm and has a capacity of 18,000 cu. ft. per hour.

A 36-in. magnet equipped with rectifier is suspended over the chip conveyor to remove tramp metal. A Model CFAS-W/Tot weightometer, installed immediately after the chip magnet, then continuously records the weight of the chips on their way to the digester.

Chemical area

In this area, cooking and bleaching chemicals are prepared. The cooking liquor is a mixture of sodium sulfite and sodium carbonate solutions which are prepared and stored separately in dilution tanks until used. The two solutions are automatically mixed in the proper proportions as needed to supply the cooking liquor for the semichemical digester.

The bleaching chemicals consist of chlorine, caustic soda, sodium hypochlorite and chlorine dioxide. The hypochlorite solution is made in a continuous system which automatically proportions chlorine gas into a caustic solution to produce a bleaching solution of the proper strength.

Chlorine dioxide is prepared in a 3-ton per day capacity plant, by reacting sulfur dioxide, sodium chlorate and sulfuric acid in an 8-ft diameter and 8-ft. high lead-lined generator. The chlorine dioxide gas which evolves from the top of the generator is absorbed in cold water in an absorption tower. The chlorine dioxide solution, containing 7 to 7.5 grams per liter of chlorine dioxide, is stored in a 24-hour supply storage tank from which it is pumped as needed to the bleach plant.

NSSC Digester

Hardwood chips are cooked in a 3500-cu. ft. capacity, 11½-ft. diameter and 48-ft. high digester clad with 316 ELC type stainless steel on A 212 Gr. B fire box steel. The chips are cooked for a period of 4½ hours with cooking temperature and pressure conditions set at 350°F. and 110 psi respectively.

Two additional digesters, 10-½ ft. diameter and 40½ ft. high with a capacity of 2800 cu. ft. each, were installed at the Mill No. 1 site to provide the fully cooked kraft pulp needed for the manufacture of liner board.

The NSSC digester operates on a cycle of 4½ cooks a day, producing about 17 tons of semichemical pulp per cook or a total of 70-80 tons per day.

The digester is indirectly heated, the liquor being pumped by a 2000-gpm pump through a heat exchanger with a 655-sq. ft. heating surface, providing a complete liquor turnover in the digester every 7½ min.

At the bottom of the digester is an 8-in. type 316 SS stainless steel blow valve equipped with hydraulic pump unit. It incorporates the latest design improvements, to give approximately 25 per cent additional capacity. It is designed for remote control operation and moderate operating pressures not exceeding 200 psi.

At the end of the cook the chips are blown at full pressure into a 24 × 68½-ft. blow tank equipped with a 75-hp blow tank agitator.

Refining, washing and screening

From the blow tank the chips are pumped by a 1500-gpm stock pump to a 36-in. stainless steel drainer conveyor where they are dewatered to the proper consistency and where a 24-in. drainer magnet, equipped with rectifier, insures complete removal of any remaining tramp metal.

From the drainer conveyor the chips pass through a 9-in. screw feeder to two 40-in. double disc refiners, of 70 tons daily capacity each.

After refining, the pulp is pumped by a 1600-gpm stock pump to the two-stage washing system of 304SS construction consisting of an 11½ × 16-ft. primary washer equipped with inlet box and speed reducer and an 11½ × 16-ft. secondary washer equipped with speed reducer. The two valveless washers, as well as an 11½ × 16-ft. decker, are enclosed in a hood.

The washed pulp goes to the screen mix tank where it is diluted to the right consistency. From here it goes to two No. 4 centrifugal primary screens and then to eight (seven primary and one secondary) centrifugal cleaners.

The clean unbleached pulp is thickened in the 11½ × 16-ft. stainless steel decker and passed to the high-density tile storage chest of 125 tons capacity.

Liquor recovery system

Drainage from the drainer conveyor and the washings from the brown stock washers are pumped to the liquor recovery system of Mill No. 1.

This liquor recovery system includes three 40-ft. diameter by 22-ft. white liquor tanks, a 50-ft. diameter by 12-

ft. white liquor clarifier, a 35-ft. diameter by 24-ft. lime mud washer, three 12-ft. diameter by 10-ft. causticizers, a 2,000-lb. per hour capacity continuous lime slaker, and a four-body quadruple-effect evaporator.

The continuous 2,000-lb. per hour lime slaker, of the N-type size 4A, is equipped with a 9-in. gravimetric quicklime feeder and a bin gate mounted above the feeder. The complete feeder and slaker assembly is installed directly under the overhead lime bin.

The slaker further incorporates a conveyor for automatically removing dregs and stones. Its outstanding advantage is the uniformity of the discharged slurry obtained largely through the use of a half-round bottom tank and vertical paddle agitation.

Principal equipment and suppliers at Crossett's No. 2 mill *(cont'd. in June issue)*

Water Supply

Deep well pumps (3), 17-in. five-stage ..... Layne & Bowler Inc.
Water supply pumps (3), 5500-gpm, 135-ft. ..... Infilco Inc.
Motors (6) ..... Reliance Electric & Eng. Co.

Wood Yard and Woodroom

Barking drum (1), 12 by 45 ft. M. bar ..... Fibre Making Processes Inc.
Chip conveyor system, belt ..... Jeffrey Mfg. Co.
Chip crusher, 36-in., 30-hp, 12-15 cords capacity ..... Waterville Iron Works
Chip magnet, 36-in. with rectifier ..... Stearns Magnetic Inc.
Chip screen, No. 72 Rotex ..... Orville Simpson Co.
Chip silo, 27 by 59 ft. ..... Stebbins Engineering & Mfg. Co.
Motors (18) ..... Reliance Electric & Eng. Co.
Rotary disc feeder, 17-ft. diameter, 5.2 rpm, 18,000 cu. ft. per hour capacity, equipped with adjustable collar, drive and discharge chute ..... Link-Belt Co.
Weightometer, Model CFAS-W/Tot ..... Builders-Providence Inc.
Wood yard conveying system, C-132 type ..... Link-Belt Co.

Digester Department

Blow tank, 24 by 68½ ft. ..... Chattanooga Boiler & Tank Co.
Blow tank agitator, 75 hp ..... Improved Machinery Inc.
B. L. circulation pump ..... Worthington Corp.
Digester (1), 3500-cu. ft. capacity, stainless clad ..... Chicago Bridge & Iron Co.
Digesters (2), 2800 cu. ft., Horton ..... Chicago Bridge & Iron Co.
Digester blow valve, 8-in. stainless with hydraulic pump unit ..... Paul Valve Corp.
Digester heat exchanger, 655-sq. ft. heating surface ..... Electric Steel Foundry Co.
Digester purge pump, 400 gpm, 300-ft. ..... Warren Steam Pump Co. Inc.
Digester liquor circulation pump, 200 gpm, 125-ft. ..... Bingham Pump Co.
Digester liquor fill pump, 1000 gpm, 90-ft. ..... Warren Steam Pump Co. Inc.
Motors (6) ..... Reliance Electric & Eng. Co.
Stock pump, 1500 gpm, 125-ft. ..... Warren Steam Pump Co. Inc.
Instrumentation ..... Foxboro Co.

Chemical Area

Chlorine dioxide generating plant, 3-ton daily capacity ..... Mathieson Chemical Co.
Bulk-Flo conveyor ..... Link-Belt Co.

Refining, Washing and Screening

Agitators for washed stock chests ..... Black-Clawson Co.
Brown stock washers (2), valveless, 11½ by 16 ft., of type 304SS, equipped with inlet box and speed reducers ..... Improved Machinery Inc.
Cleaners (8), seven primary, one secondary ..... Bauer Bros. Co.
Centrifugal screens (2), No. 4 type ..... Improved Machinery Inc.
Consistency regulators (2) ..... DeZurik Shower Co.
Crane, 20T span 33 ft. ..... Manning, Maxwell & Moore Inc.
Decker, valveless, 11½ by 16 ft. stainless steel ..... Improved Machinery Inc.
Double disc refiners (2), 40-in. ..... Bauer Bros. Co.
Drainer conveyor, 36-in. stainless steel ..... Bauer Bros. Co.
Drainer magnet, 24-in. with rectifier ..... Stearns Magnetic Inc.
Feed conveyor with reducer, 6 in. by 55 ft. ..... Link-Belt Co.
High-density towers (3), tile, 30 by 58 ft. ..... Stebbins Engineering & Mfg. Co.
High-density tower agitators (3), 42-in. No. 304SS, with swing and suction nozzles ..... Improved Machinery Inc.
Instrumentation ..... Foxboro Co. and Panellit Inc.
Motors (50) ..... Reliance Electric & Eng. Co.
Motor controls (2), 2400 volt, Bauer refiner controls ..... Westinghouse Electric Corp.
Piping ..... Grinnell Co. Inc.
Rotary vane feeder ..... Sprout, Waldron & Co. Inc.
Screw feeder, 195-in., stainless steel screw ..... Bauer Bros. Co.
Screw feeder, 9-in. screw ..... Bauer Bros. Co.
Screw repulper, 28-in. ..... Improved Machinery Inc.
Screened stock pulp, 400 gpm, 150-ft. ..... Warren Steam Pump Co.
Stock pump to washers, 1600 gpm, 60-ft. ..... Sandy Hill Iron & Brass Works
Stock pump to screen, 1600 gpm. 60-ft. ..... Sandy Hill Iron & Brass Works
Screened stock surge tank, tile, 15 by 21 ft. ..... Stebbins Engineering & Mfg. Co.
Screened stock surge tank agitator ..... Black-Clawson Co.
Stock pumps (2), 1200 and 1500 gpm ..... Warren Steam Pump Co.
Surge chest ..... Stebbins Engineering & Mfg. Co.
Surge chest agitator ..... Improved Machinery Inc.
Washed stock chest (1), tile, 15 by 21 ft. ..... Stebbins Engineering & Mfg. Co.
Washed stock pump, 440 gpm, 160-ft. ..... Warren Steam Pump Co.
W. W. pump to screens, 4200 gpm ..... Warren Steam Pump Co.

Liquor Recovery

Evaporators, quadruple effect, 112,000 lb. per hr. evaporating capacity ..... Swenson Evaporator Co.
Causticizers (3), 12-ft. diameter by 10 ft. ..... Chicago Bridge & Iron Co.
Lime slaker, Type N, 2000 lb. per hour capacity, equipped with a Wallace & Tiernan Merchen 9-in. gravimetric feeder ..... Infilco Inc.
Lime mud washer, 35-ft. diameter by 24 ft. ..... Chicago Bridge & Iron Co.
White liquor clarifier, 50-ft. diameter by 12 ft. ..... Chicago Bridge & Iron Co.
White liquor tanks (3), 40-ft. diameter by 22 ft. ..... Chicago Bridge & Iron Co.

Bleaching System

Bleached stock conveying system, five conveyors including three reversible ..... Birmingham Fabricating Co.
Instrumentation ..Panellit Inc., Foxboro Co. and Fischer & Porter Co.
Motors (43) ..... Reliance Electric & Eng. Co.
Mixers, two chlorine mixers with drive ..... Improved Machinery Inc.
Mixers, D. S. mixers with drive, C. I. high-density ..... Improved Machinery Inc.
Mixers, one chlorine dioxide single-shaft mixer, Hastelloy "C", high-density ..... Improved Machinery Inc.
Pumps, stock, refiner, kraft and surge chests ..... Black-Clawson Co.
Pumps, stock and w. w. dilution, fresh water ..... Warren Steam Pump Co.
Seal boxes (4), chlorine, caustic, hypo, chlorine dioxide ..... Stebbins Engineering & Mfg. Co.
Tower, caustic, 13½ by 41 ft. ..... Chattanooga Boiler & Tank Co.
Tower, chlorination, tile ..... Chattanooga Boiler & Tank Co.
Tower, chlorine dioxide, 18½ by 55 ft. ..... Chattanooga Boiler & Tank Co.
Tower, hypo, 18½ by 41 ft. ..... Chattanooga Boiler & Tank Co.
Towers (2), pre-retention, rubber-lined ..... Chattanooga Boiler & Tank Co.
Tower circulators with drive and dilution nozzles ..... Improved Machinery Inc.
Towers, high-density storage (3), 28 by 58 ft. equipped with Impco agitators ..... Stebbins Engineering & Mfg. Co.
Washer, chlorination, 11½ by 16 ft., equipped with rubber-covered sectional hood ..... Improved Machinery Inc.
Washer, caustic, 11½ by 16 ft., No. 304SS ..... Improved Machinery Inc.
Washer, hypo, 11½ by 16 ft. ..... Improved Machinery Inc.
Washer, chlorine dioxide, 11½ by 16 ft., with sectional hood ..... Improved Machinery Inc.

The four-body quadruple effect black liquor evaporator is equipped with integral liquor heaters which provide more effective use of the evaporator's heat transfer surface. The evaporator concentrates the liquor to 50 per cent total solids and has an evaporation capacity of 112,400 lb. of water per hour.

Bleaching operation

Unbleached kraft pulp (washed and screened) is pumped from Mill No. 1 to a 125-ton capacity tile storage chest located in Mill No. 2. Before entering the 125-ton storage chest it is thickened in a thickener located on top of the chest.

The daily requirements of Mill No. 2 are 110 tons of kraft and 65 tons of semichemical pulp. In order to supply these tonnages, kraft is bleached for two consecutive days and semichemical pulp for one day in a continuous three-day bleaching cycle.

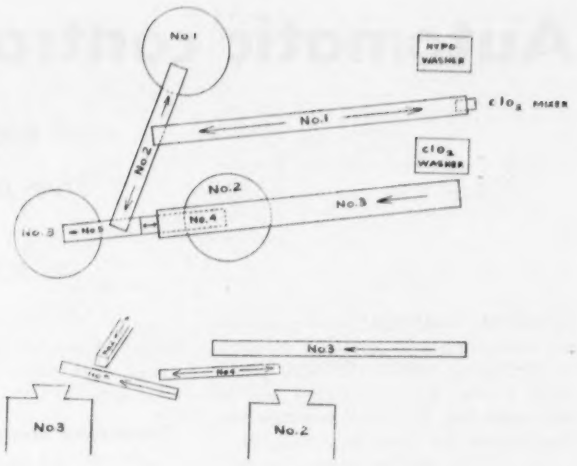
No. 2 Mill uses three types of bleached pulp: (1) semi-bleached kraft which is of intermediate brightness, (2) fully bleached kraft which is of 85-90% brightness, and (3) fully bleached semichemical pulp which is of 85% brightness. The semi-bleached kraft and the fully bleached semichemical pulps require three stages of bleaching. The fully bleached kraft pulp goes through an additional super bleaching stage with chlorine dioxide to obtain the required degree of brightness.

The bleaching plant, accordingly, has four continuous bleaching stages, i.e., the chlorination stage, the caustic extraction stage, the hypochlorite stage, and the chlorine dioxide stage.

The equipment in the chlorination stage consists of a tile-lined chlorination tower, two rubber-lined pre-retention towers, two chlorine mixers equipped with "Line" RC type drive, a 5000 gpm stock pump to chlorine washer, a 1000 gpm fresh water pump (supplying water to the chlorine, caustic, hypo and chlorine dioxide washers) a chlorine seal box, and a 11½ × 16 ft. chlorination washer equipped with rubber-covered sectional hood.

The caustic extraction stage equipment consists of a 13½ × 41 ft. caustic tower, a 2000 gpm stock pump to caustic washer, a seal box, and a 11½ × 16 ft. No. 304 SS stainless steel caustic washer.

The equipment in the hypo stage includes an 18½ × 41 ft. hypo tower equipped with circulator and drive, a seal box, an 11½ × 16 ft. No. 304 SS stainless steel hypo washer equipped with speed reducer, and a stock pump to hypo washer.



Diagrammatic presentation of the bleached stock conveying system

The equipment in the chlorine dioxide stage includes a chlorine dioxide single shaft mixer made of Hastelloy "C" and equipped with speed reducer. an 18½ × 55 ft. chlorine dioxide tower with circulator, drive, and dilution nozzles, a seal box, a chlorine dioxide washer, and a stock pump to the chlorine dioxide washer.

An unusual feature of the bleaching system is the conveying system that conveys bleached semichemical pulp, fully bleached kraft pulp, and semi-bleached kraft to the (1) NSSC high density storage tower, (2) kraft high density storage tower, and (3) semi-bleached kraft high density storage tower. All three storage towers are 28 ft. in diameter and 58 ft. high and have a capacity of 125 tons each. All pulps are stored at 12 per cent consistency in the high density towers.

The conveying system, which is partly reversible, as illustrated in the diagram, can take semi-bleached kraft pulp after the hypo washer and convey it either directly to the high density storage tower No. 3 or to the chlorine dioxide mixer for bleaching in the chlorine dioxide stage.

The same conveyor can take fully bleached semichemical pulp after the hypo stage and convey it to the high density storage tower No. 1.

Since sections of the conveying system are reversible, semibleached kraft or fully bleached semichemical pulp can be fed at will into either of the high density towers No. 1 and 3 if desired. Similarly, fully bleached kraft pulp after the chlorine dioxide stage can be fed into high density towers No. 2 and 3. It should be noted, however, that under no condition can any other but fully bleached kraft pulp be fed into the high density tower No. 2.

Pipe system connection

Mills No. 1 and 2 are connected with a pipe system to permit the interchange of kraft pulp, water, liquor and steam between the two mills. The pipe system consists of six pipes which supply

(1) Unbleached kraft pulp at the rate of 7 tons per hr. and at 3 per cent consistency from Mill No. 1 to Mill No. 2.
(2) Steam at 450 psi pressure at the rate of 125,000 lb. per hr. from Mill No. 1 to Mill No. 2.
(3) 14,000,000 gal. per day of softened water from Mill No. 1 to Mill No. 2.
(4) Condensate return is pumped by a 500 gpm pump from Mill No. 2 to Mill No. 1.
(5) 100,000 gal. per day of spent liquor at 10 per cent total solids are pumped from Mill No. 2 to the liquor recovery system of Mill No. 1.
(6) White water is pumped by a 1500 gpm pump from Mill No. 2 to Mill No. 1.

Water supply

The water supply comes from a buried pre-historic river bed eight miles southeast of Crosset. Five wells have been sunk into this bed and the water is pumped by five 17 inch five-stage deep well pumps to supply the vast quantities of water needed.

The well pumps pump the water through a 30-in. concrete-lined steel pipe into a precipitator where calcium, iron, and manganese are removed. The water is softened in a 85 ft. diameter × 23 ft. conically-shaped steel tank equipped with center agitator and of 8300 gpm capacity. Treated water is stored in a 1,000,000 gal. prestressed concrete reservoir.

Automatic control*

—of electrical load and frequency in captive power generating plants

W. H. SISSON**

SEVERAL DIFFERENT problems are encountered in applying automatic control to captive electrical generating plants. These problems will be discussed first and then recommendations given for their best solution.

Let us first consider generation supplying power to a manufacturing plant without interconnection or tie lines to a utility (outside source of power). The load changes on a system of this type cannot be predicted with any great degree of accuracy and may occur at any moment. Naturally the automatic controls must recognize these load changes and make corrections by changing the outputs of the generators to meet the demand.

Measurement of load changes in terms of kilowatts or megawatts is not sufficient because we must also maintain a constant frequency, for instance 60 cycles per second.

Fundamentally, frequency is a function of generator rotor speed (rpm). If a generator is designed to run at 3600 rpm to generate 60 cycle current, then it is only necessary to provide a controller that will make the machine turn over at 3600 rpm.

On the other hand, load output of a generator is determined by the throttle setting of the prime mover. Proper excitation of the generator field is controlled by equipment not discussed in this paper and is not a part of the frequency or load control system.

When the load on the generators is increased the first result is a reduction in rotor speed. Normally, the governor on the turbine is designed to maintain a synchronous rotor speed and would solve our control problem if it were not for the fact that all governors have a "dead band" and therefore produce a small deviation, due to load changes, from the desired control "set point". The automatic controls tend to eliminate this "dead band" and the deviation from the "set point".

Now, the next logical assumption would be to measure rotor speed (rpm) and control from this measurement. Again the answer is "NO" because tachometer type instruments are not accurate enough.

Frequency control system

The proper solution to our problem is to measure frequency continuously and do it rapidly and accurately, because a slight deviation in frequency (0.005 cycles) is an indication of change in rotor speed even though it be just a fraction of an rpm. If we maintain frequency by regulating the speed adjustment motors that exist on the governors of each turbine, we automatically take care of load changes on our electric system.

The Honeywell Flat Frequency control system is outlined in Figs. 1 and 2.

The frequency recorder controller is calibrated 59 to 61 cycles across a full 10½-in. wide chart range. It incorporates a pulse integrating, continuous and fast measuring circuit as well as continuous balancing, which means that the indicating pointer and the pen on the recorder will always follow changes in frequency. This measuring circuit will only respond to, or measure, changes in the fundamental frequency and is not responsive to harmonics which appear on the lines.

The frequency recorder controller is equipped with contacts which produce "raise" and "lower" pulses to raise generation when the frequency drops below the set point (i.e. 60 cps) and to decrease generation when the frequency rises above the set point. The control pulse rate is adjustable so that the controller may be adapted to any generator, that is, one driven by a hydro turbine, a steam turbine or an internal combustion engine.

The control instrument also incorporates adjustable low and high alarm contacts to operate audible and visual alarms in case the frequency ever deviates more than pre-determined limits. These contacts may also be used to trip the control under severe upsets, if desired.

The set point of the controller is manually adjustable so that control may be established at some frequency other than the fundamental in order to allow the operator to make up lost time in cases where peak loads may have exceeded generating capacity and caused operation at a lower frequency.

A manual to automatic switch is provided and the "raise" and "lower" push buttons, or switch, is maintained in case manual operation is desired to be initiated at the controlled.

All of the foregoing explanation pertains to flat frequency control of of a single generator. If more than one generator is required for control of frequency, then the foregoing method will be found insufficient in that it will not maintain equal loads on two or more generators. In fact, it may load some generators while others may be found carrying very light loads.

As a general rule, fairly good frequency control can be obtained by controlling approximately 20 per cent of the generating capacity available.

Proportional control system

When it is necessary to control more than one generator to maintain frequency, the controller must keep equal loads on each, or a predetermined division of load on all generators on control. In this case the controller appears similar to the one previously mentioned, but instead of using contacts it incorporates a series of slide wires to hold each generator at a prescribed load in relation to all other generators on control.

This proportional control system (Fig. 3) produces "raise" and "lower" pulses to operate the speed adjustment motors on the governors, and it is also very desirable to incorporate the thyratron relay instead of using magnetic type relays to complete the circuits to the governor motors. This eliminates contact troubles and frequent replacement of relays as well as provide a continuously variable pulse rate which becomes faster as the frequency deviation from 60 cycles becomes greater until a maximum allowable rate of change of generation is reached.

Suitable frequency and load limit alarms or trips are supplied and in-

*Presented at the AIEE Pulp and Paper Conference, Gainesville, Fla., March 8-9, 1956.

**Minneapolis-Honeywell Regulator Co., Brown Instruments Div.

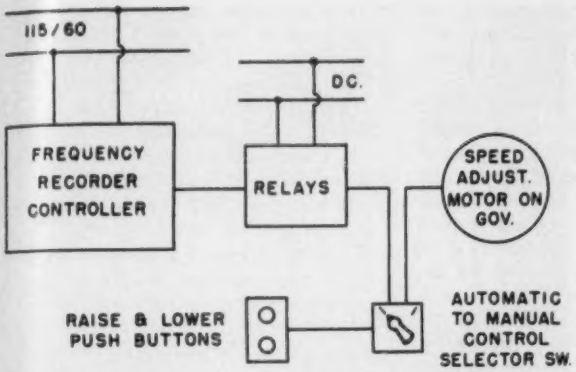


Fig. 1. Flat frequency control system for one generator

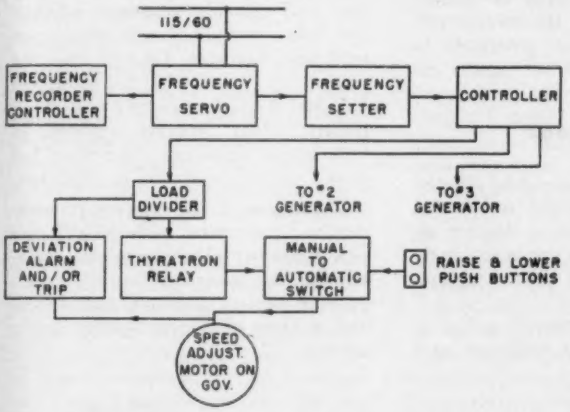


Fig. 3. Flat frequency proportional control system for two or more generators

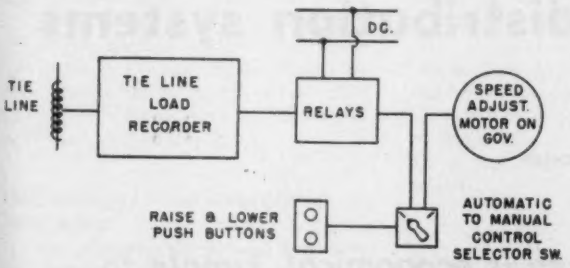


Fig. 5. Tie line load limiting system

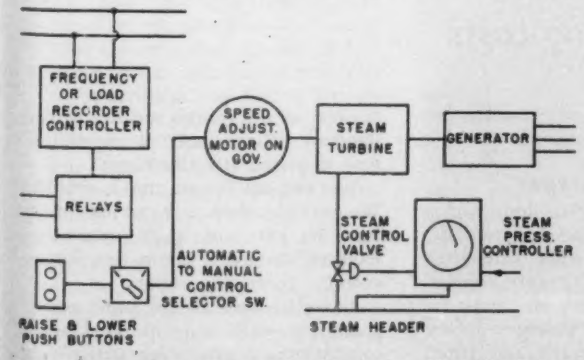


Fig. 7. Load or frequency control system incorporating bleed steam control

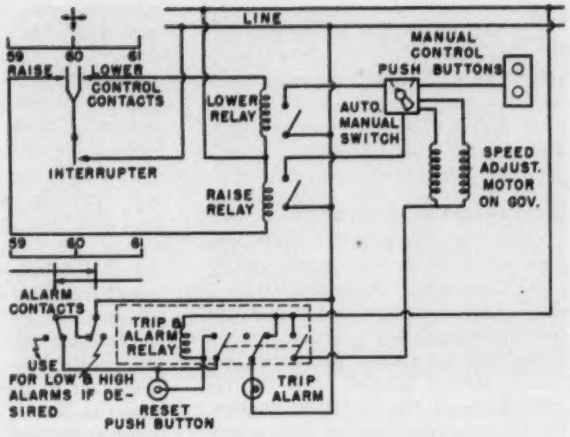


Fig. 2. Typical schematic for flat frequency control system for one generator

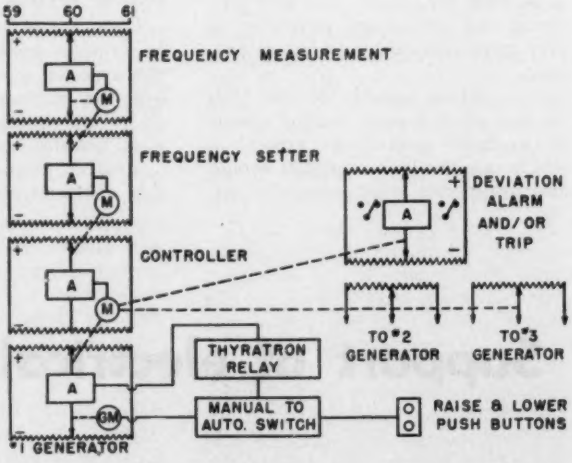


Fig. 4. Typical schematic for flat frequency proportional control system for two or more generators

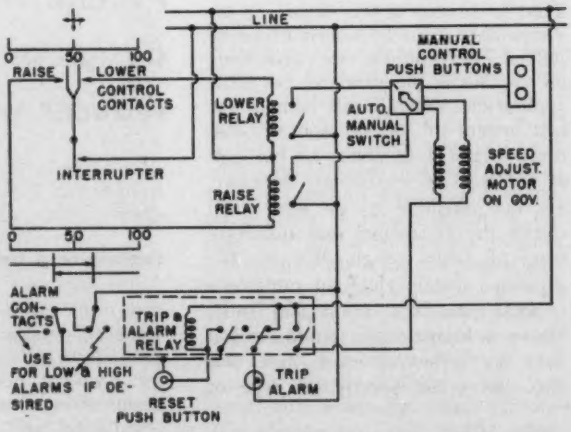


Fig. 6. Typical schematic for tie line load limiting system

corporated for safety purposes.

As previously stated, the proportional control system will maintain all generators in parallel or on equal load. Another feature can be added, if desired, to incrementally load or provide separate loading curves for each generator for best efficiency.

Load recorder controller

Let us consider a captive generating plant which is of insufficient capacity to generate all of the power requirements, making it necessary to purchase some power from an outside source. In this case we shall forget about frequency control because it is the responsibility of the Utility to regulate the system, unless in rare cases where the captive plant may be relatively large and may be required to help in the overall regulation.

One method of control for the above mentioned conditions would involve a load recorder controller used to measure the amount of power purchased and control our generation to keep purchased power as low as possible.

It is entirely possible that the Utility may place a peak demand charge on excessive amounts of power, in which case the load controller should also incorporate extra contacts to signal these peaks or to actually trip off some plant load, such as an air compressor, to eliminate the peak demands. (Figs. 5 and 6.)

In some cases a contact with a Utility may be drawn upon a fixed amount basis whereby the purchaser agrees to pay for a fixed amount (kwh) per day, week, or month and any excess used over this quantity would be paid for at a high cost. Naturally it is desirable to consume as much of the power contracted for without peak charges.

The controller should be on the tie line between the Utility and the captive plant to measure the amount of power as near as possible to the maximum permissible quantity of outside purchased power and the control will then cause the captive generators to furnish any deficiency of power required.

Advantages of a good control system

Considerable savings can be affected by using a good control system for this type of operation in that it allows the purchaser to consume nearly all of the contracted power without peak demand charges.

Another problem that is solved is that of maintaining a sufficient supply of steam for heating and processing loads in the plant when turbine bleed steam is used for this purpose. (Fig. 7).

The control system will take into account such steam requirements and allocate electrical generation among the machines being controlled to maintain electrical load requirements as well as process steam capacity.

Penalty factor adjustments are provided, when desired, to allocate generation to the various machines based on relative efficiency and to take into consideration the availability by-product fuel or heat.

It is a proven fact that automatic control does improve station operation and provide customer satisfaction when frequency and voltage are held more constant. Control does not produce excessive wear on governors nor does it produce excessive loads on boilers, when properly applied. In fact, actual operating experience has shown an improvement in efficiency.

Regardless of the type of problem involved, automatic controls will provide smoother plant operation, maintain proper frequency and voltage, provide better customer satisfaction, and increase efficiency, thereby saving money.

Support of electrical distribution systems

JOSEPH BECHER*

Metal trough is economical, simple to design and install, saves space and reduces wiring costs

EVALUATION OF A NEW SYSTEM is difficult unless there is some comparative basis by which it can be judged. Accordingly, we shall here use conduit as the standard. For some applications, conduit still remains the best system of support and we continue to use it in about 10 per cent of our work. Comparisons, therefore, are not intended to do more than clarify the advantages and disadvantages of cable trough. We use the expanded metal trough in preference to solid types because it is less costly, allows a higher cable rating, and it does not collect as much dust. We also prefer and specify the type of trough that has standard fittings for elbows, risers, drop-outs, etc.

*Assistant Chief Electrical Engineer, Burns & Roe Inc.

Engineering advantages

The engineer who is designing a new distribution system will find that trough is easier to work with than conduit. With conduit, every connector, drop-out, new line, etc., must be designed in advance. Changes during installation are awkward and often costly. Trough installations are more flexible, as the trough can be cut and standard fittings inserted in straight runs to permit late alterations.

The original design, too, is simpler. We would estimate a saving of at least 10 per cent in the manhours required to design the system for an average generating station.

Trough simplifies the good use of space near walls and ceilings. During construction, a generating station is a very crowded place and access to sev-

Conduit and expanded metal cable trough drop-outs through the bottom of the trough support cables from motor generator at Scott Paper Co.'s Everett mill

Power and control cables fed to switchgear are readily accessible, neat and uncluttered in spite of cable concentration

eral areas is generally harder to arrange than is access to one. Since trough saves a great amount of space, it is particularly applicable in this situation. Morever, installation of cable is much faster and this minimizes confusion and crowded conditions.

In regard to space requirements, we would estimate a saving of about 50 per cent over conduit. The saving is even greater if more than two layers of cable are laid in the trays, but we do not recommend this practice unless current ratings are very low and overheating is not a problem. These savings are not fully realized with more than one run of trough as working room must be left between levels.

Space becomes most important when cuts must be made through walls or floors and when approaching control panels. Here trough is of great value. This holds true in vertical as well as horizontal runs.

Advantages from operator's viewpoint

The advantages of trough over conduit will be immediately apparent to the engineer's client in that the trough system is both easier to design and install than the conduit system, and the resultant savings are quite evident.

Comparative costs can be broken into two parts: installation and material. Installation cost figures are determined almost exclusively by the time involved. Theoretically, a trough system could be installed in less than half the time required for conduit of equivalent capacity. Probably the savings in installing the cables are even greater, as cable is simply laid in place.

On an average, we would estimate a saving of about 25 per cent in installation costs — a substantial figure, since this is the largest cost item.

Perhaps it is well here to point out that there are differences among trough systems, too. Older types require nuts, bolts, and washers for each connection. For example, the old Cope System required as many as 50 different pieces for each connection of 24-in. trough. The new Cope 70,000 Series uses a pin-type coupling that secures the connection like a nonmovable hinge. The fittings are welded to the trough itself so that two pins and a bottom plate are the only pieces needed for a connection. Thus, the elimination of 47 pieces should further reduce the time needed for installation, and effect a savings of something better than the 25 per cent estimated.

Materials savings are also significant. A 10-ft. run of 24-in. trough weighs 520 lb. less than 10 ft. of the equivalent capacity of 4-in. conduit. It is apparent that there is a saving of more than a ton of steel in every 40 ft. of cable support when using trough.

Cope expanded metal cable trough forms a completely closed drop-out for high concentration of power and control cables going into switchgear panel cabinets

The electrical properties of cable in trough are superior to those of cable in conduit. We allow a free air rating if no more than two layers of cable are laid in expanded metal trough. The rating in conduit is approximately .65 if only 4 cables are used — even less if the number is greater. This means an increase of 20 per cent in current carrying capacity for the same cable. For similar current capacity, smaller cable is permissible in trough.

If the trough is considered a raceway instead of a support, the electrical properties of the trough itself must be considered. Tests seem to show conclusively that the trough is a sufficiently good conductor to activate the circuit protective devices on ground fault. It is conceivable that some trough connections might not be electrically tight, but we have not experienced any trouble in several hundred installations and have not had to require bonding across section joints. This would indicate that the electrical properties of each type of system are approximately equal.

One big advantage of trough for some installations is its adaptability to later modernization and expansion. There are few installations where one is certain that there never will be a new circuit needed or a change made in existing equipment requiring new cable! Addition of a new circuit or even several new circuits is a simple matter with a trough system as the new cable is added into the existing trough. It is not good practice to pull new cable through conduit in excess of 40 per cent of the cross-sectional area. The alternative is to run more conduit and this is always costly even if possible. Major additions, too, are easier with a trough system for the same reasons that apply to new installations.

What coatings do for paper

The synthesis of paper coatings frequently starts in the laboratory

The first of a series of ten articles dealing with the technology of paper coating

ONLY A LIMITED NUMBER of properties are generally imparted to paper by the paper manufacturer. He can vary within limits the strength of the paper. By beating the pulp finer he can produce a transparent paper (glassine) which has good grease resistance. By incorporating certain chemical additives at the wet end of the papermaking machine, he can impart to the paper varying degrees of wet strength. Beater additives are available which will size the paper. By choosing carefully his raw materials he can control the color, brightness, texture, and porosity of the paper.

He can, of course, tub-size his paper or coat it with inorganic coatings on the machine; but strictly speaking, such operations come under the classification of paper coating and are not inherent in the paper manufacturing process. The point is that in order to upgrade paper and to impart to it properties which are not inherent in the papermaking process we must resort to the coating of paper. This is done either as the paper comes off the papermaking machine or in some subsequent operation.

The coating of paper may enhance its beauty and decorative qualities. It may improve the wet or dry strength of the paper and it may give it certain functional qualities, e.g. dielectric properties which will make the paper suitable for use in the electrical industry while certain protective properties make the paper suitable for packaging.

The primary interest in the packaging field is to obtain paper with good moisture vapor resistance. Grease resistance is also an important quality, as is resistance to water, acids, alkalis, organic solvents, and chemicals. If the paper is scratch-proof or abrasion resistant, its value is also enchanced. Of recent importance is paper which is gas-proof. If the paper will form a bond to itself or to other substances by the application of heat—that is, if it will heat-seal—a whole new field of applications is available. Frequently, it is necessary to coat paper in order to protect the printing on it, for most printing inks are not highly functional in terms of the properties that have just been described. Coatings which serve this purpose are called overprint varnishes or lacquers.

How this impressive list of functional properties is achieved, will become apparent as the discussion progresses. In the description of the various types of coating materials, emphasis will be placed on the properties which are inherent in these compounds and which they impart to a substrate when spread over it as a thick film.

Moisture vapor resistance

Since moisture accounts for the spoilage of many perishable foods, a good moisture vapor barrier is an essential factor in modern packaging technology. Furthermore, military uses demand papers with a high degree of resistance to moisture vapor transmission. Dehydrated foods in particular must be packaged in such a way that they are protected from moisture. Numerous chemicals must be packaged in containers which will prevent them from absorbing moisture and metal objects must be packaged in such a way that their surfaces are not corroded by moisture. All these requirements present a constant challenge to the manufacturer of packaging materials.

Actually no material used in packaging is completely impervious to the transmission of moisture vapor. Paraffin or microcrystalline waxes are general considered excellent but their brittleness limits their usefulness, especially for such applications where the paraffin coated paper must be creased or folded. Metal foils such as aluminum foil are also excellent, but they too are subject to damage due to excessive folding.

Various resins are in use which provide good resistance to moisture vapor transmission. Some of these which are used as unsupported films are rubber hydrochloride (Pliofilm), polyvinylidene chloride (Saran), and moisture proof cellophane. Pliofilm was used extensively during the last war for a specific type of packaging which required a highly effective moisture

vapor proof barrier. In addition to using Pliofilm, a dehydrating agent was placed within the package to absorb any moisture which did pass through. Pliofilm has the added advantage of being a heat-sealing resin.

The moisture vapor properties of polyvinylidene chloride films are excellent. Its disadvantage lies in the difficulty of heat sealing the film, which shrinks at a temperature above 90° F. This property of shrinkage, however, provides the basis for a unique packaging process.

Moisture proof cellophane, which is cellophane coated with a combination of nitrocellulose and wax, is a good moisture vapor proof barrier. Its disadvantage is that it becomes brittle at low humidities.

As indicated, Pliofilm, Saran, and moisture proof cellophane are used largely as unsupported films. Strictly speaking, they are therefore not paper coatings. For coatings, wax or combinations which are predominately wax are the most commonly used materials for obtaining resistance to moisture vapor. This is true because of the low price of wax and because of the excellent properties it provides on uncreased or unfolded surfaces.

Water resistance

There are a great many resins which will provide resistance to water even though many of them present virtually no barrier to moisture vapor. Included in this category of water resistant coatings are waxes, asphalts, vinyl resins, cured epoxy resins, urea formaldehyde resins, rubber hydrochloride or chlorinated rubber, acrylic resins, phenolic resins, polyamide resins, hydrocarbon resins, and the silicones.

Grease resistance

Grease resistance may generally be imparted to papers by resins which are water soluble or water dispersible. One of the earliest materials used to obtain grease resistance was glue. Gelatin, starch, casein, and sodium alginate are naturally occurring materials which are water dispersible and which impart grease resistance. Zein is a proteinaceous material obtained from corn which also imparts a high degree of grease resistance. Synthetic gum-like material such as sodium carboxymethyl cellulose, methyl cellulose, polyvinyl alcohol, and sodium polyacrylates are frequently used where grease resistance is required.

A degree of moisture vaporproofness and water resistance, in addition to good grease resistance, is imparted to paper by certain vinyl resins such as polyvinyl chloride and certain copolymers of vinyl chloride and vinyl acetate. In this category are also cellulose derivatives such as cellulose acetate-propionate and ethyl cellulose. Certain phenolic resins and certain amino-formaldehyde condensates, as well as rubbers, such as Neoprene impart good grease resistance as well as some water resistance. The polyamide resins are unique in possessing a high degree of both grease resistance and moisture vapor resistance. Cured epoxy resins are also grease resistant. In general, however, their water resistance is poor.

Alkali and acid resistance

Alkali resistant papers are important for packaging of highly alkaline materials such as soap, or for packaging of materials which might possibly be harmed by alkaline conditions. Alkali resistance is inherent in coatings based on hydrocarbon resins, polyvinyl chloride, certain vinyl copolymers, acrylic resins, phenolic resins, chlorinated rubber, cured epoxy resins, ethyl cellulose, polyamide resins either alone or in combination with epoxy resins, styrenated alkyds, melamine resins, polystyrenes, various rubber latices, polyvinylidene chloride, and thermosetting phenolic resins.

Acid resistance is generally imparted by acrylic resins, most vinyl resins, hydrocarbon resins, phenolic resins, and chlorinated rubber.

Solvent and chemical resistance

Solvent and chemical resistance is shown by water soluble coatings such as polyvinyl alcohol. The hydrophylic nature of this material makes it highly resistant to organic solvents. On the other hand, it has the disadvantage of not being resistant to water and moisture vapor. In general, no one coating material will provide resistance to all solvents, chemicals, and proprietary products. The polyvinyl chloride and polyvinyl chloride acetate copolymer coatings are quite solvent resistant in general, but are harmed by ketones and esters. The polyamide resins alone and in combination with epoxy resins demonstrate good solvent resistance as compared to most coating materials. Polyvinylidene chloride, urea formaldehyde, and cured phenolics are among the resins whose solvent resistance is generally considered good.

Abrasion resistance

Associated with abrasion resistance are the properties of hardness and mar-proofness. These properties are achieved by the use of nitrocellulose, melamine or urea formaldehyde resins, thermosetting phenolic resins, certain vinyl resins, chlorinated rubber, and polyamide resin-epoxy resin combinations. Also ethyl cellulose, copolymer vinyl chloride-vinyl acetate resins, and synthetic resin-varnish combinations are effective

Resinous materials which protect surfaces from abrasion and marring are of particular value for so-called overprint varnishes or overprint lacquers. These are applied over labels, book covers, gift wrappings, and shelf paper where abrasion resistance, scratchproofness, and resistance to chemicals, solvents, oils, and water may be required. Other examples of applications for protective coatings include automobile seat covers which are manufactured from twisted paper. Here a plastic coating increases the resistance of the surface to water, dirt, and grease. Surgical sheets used on operating tables, stretchers, and in morgues, especially on the battle field, are made from a high grade of paper coated with a plastic coating for further protection. Inexpensive luggage fabricated from cardboard such as brief cases, card cases, etc., are improved by overprint varnishes or lacquers. Teletype paper and papers used electrically are all improved by coating with overprint varnishes.

Gas resistance

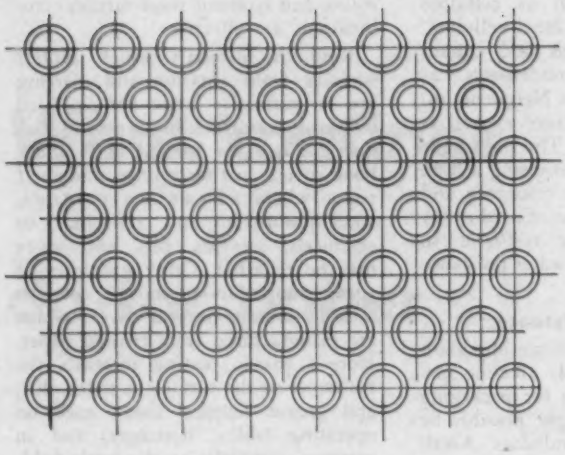
The resistance to the passage of air or gases is one of the newer requirements of the packaging industry. In general, effective moisture vapor barriers are also effective gas barriers. Polyvinyl alcohol, rubber hydrochloride, polyvinylidene chloride, and polyethylene are among the resins which provide effective gas barriers.

Heat sealing

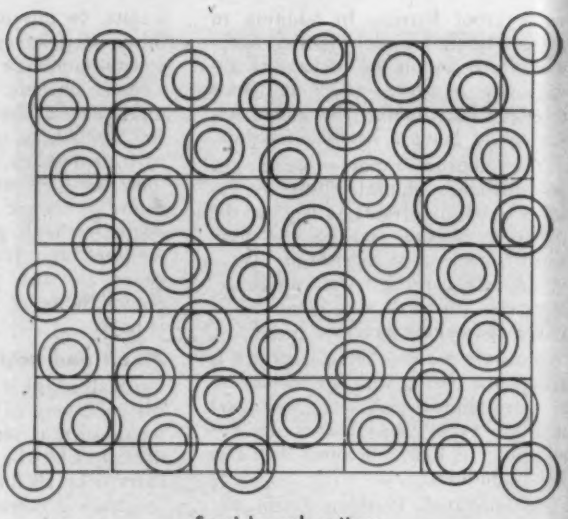
A heat sealing resin is one whose films are normally solid and nontacky. To be effective it must be nonblocking to the point where the coated paper can be stacked in sheets or rolled in rolls without the coated side of the paper sticking or blocking to the uncoated side. Such heat seal coatings, then, when heated to a certain threshhold temperature become tacky, and the application of pressure serves to effect a bond between the coated material and a variety of surfaces such as tin, glass, various papers, including label paper, kraft, and glassine foils and plastic films.

The advantages of heat sealing methods over the use of conventional glues lies in improvement of strength of the bond, better appearance of package, and, what is most important, an increase in packaging speed. Heat sealed films are generally stable and the user does not have to contend with glues which harden on aging, separate on storage, or decompose due to bac-

(Continued on page 174)



Straight couch pattern



Special couch pattern

Suction roll noise reduction

Program at Beloit Iron Works the result of several years' research and development

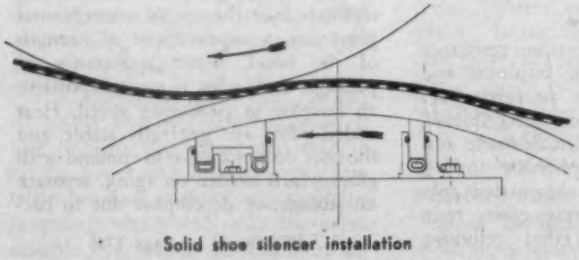
C. B. DAHL

AN EFFECTIVE PROGRAM of suction roll noise elimination has been inaugurated at Beloit Iron Works for new machines and replacements as a result of several years intensive research and development work. Silencers are also available for rolls in operation. The physical characteristics and source of the noise were determined, which provided the fundamental knowledge necessary for design of quiet drill patterns and better silencers.

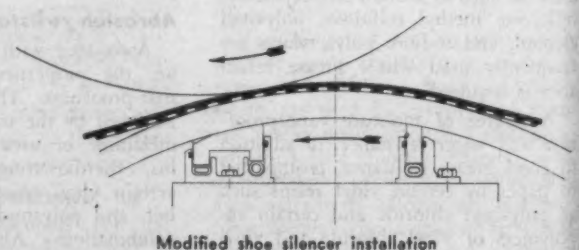
Special drill patterns

A single row of holes was drilled around the circumference of an experimental suction roll blank. Oscillograms of the noise emanations from these single holes were made, running the shell in an experimental press section at various speeds. It was established that the noise is created inside the roll when the air-evacuated hole breaks into atmosphere (like popping a cork from a bottle) after passing the suction area; and a wave form analysis determined that each hole emanates a noise pulse at a frequency of which the depth of the hole is one-quarter wave length. The pulse decays uniformly and gradually to a negligible amplitude in about five or six cycles.

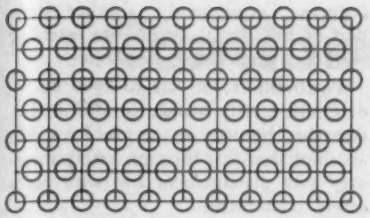
The design of quiet drill patterns is simply to put the noise pulses as much out of phase with each other as possible. Since each hole emanates the same frequency noise pulse, they can be so displaced from each other to provide considerable cancellation at all speeds. The special drill patterns, based on this premise, are more random in nature and provide much lower noise levels and more tolerable frequency spectrums than either the helically drilled or straight drilled patterns. Practically



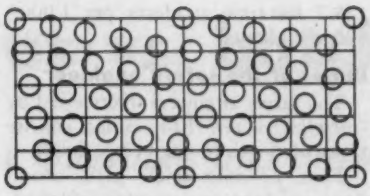
Solid shoe silencer installation



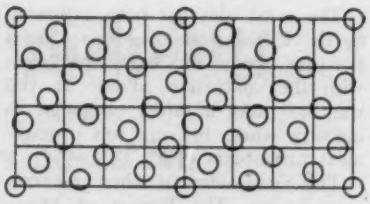
Modified shoe silencer installation



Straight press pattern



Helical press pattern



Special press pattern

all new rolls are now being drilled with the special patterns.

Silencers

Efficient silencer design must incorporate means to prevent the noise pulses from being formed. This is best accomplished by bleeding atmospheric air slowly and uniformly back into the holes. Tests of many different types of silencers proved a plain solid shoe silencer to be most efficient in most cases, and a modified shoe was best for the remaining cases. The solid shoe silencer forces the holes to fill from the outside of the roll, and the gap formed between the felt or wire and the roll restricts the flow of air into the holes. The modified solid shoe silencer is designed for use with heavy felt cover and on open draw couches. The holes fill partially through the felt or sheet, and the remainder is filled through the small gap on the trailing edge of the silencer.

A felt, sheet, or gap is depended on to restrict flow enough to prevent formation of the noise pulses.

Lowest noise levels are obtained when silencers are used in combination with quiet drill patterns. Silencers are therefore being incorporated into all new rolls except those for low speed machines and certain very low vacuum rolls.

Man—not machines—main cause of industrial accidents

DR. W. SCHWEISHEIMER

RECENT INVESTIGATION has shown that only one out of ten industrial accidents is caused by failure of equipment. The remaining nine must be blamed on human error.

Actually, predictable hazards have been removed from most machines. Safety is a primary consideration in equipment design everywhere. In industry it is the same as in driving: human carelessness is the major cause of industrial accidents.

Why some workers have more accidents

Here are a few findings on why some workers will have more accidents than others, though both groups are working with the same kind of machines:

1. Emotional attitudes count. Workers discontented with their jobs, or with life in general, are more apt to be careless.

2. Work atmosphere is important. Fair supervision and cooperation of labor and management help create a climate of work that increases job safety. Supervisors should listen to complaints.

3. Compatibility is important. A man who feels a strong dislike for another on the job will not be too efficient.

4. Personal problems create safety hazards. The worker who is worried about money and security, who had an argument with his wife in the morning before leaving for work, whose children are sick, is far more likely to daydream than one whose life is serene.

Safety engineers in big and small plants

Safety engineers are steadily gaining importance in industrial plants. However, there are significant differences between engineers in big and small plants. In plants that employ less than 1000 people, the safety engineer is likely to double as a plant manager, plant engineer, quality control overseer, etc. *Chemical Week* recently made a survey of the activity of safety engineers. This is how it breaks down:

1. In plants employing less than 200 people, the safety engineer spends only 38 per cent of his time in actual safety work.

2. In plants employing between 200 to 500 people, one third of the safety engineers work full-time in safety. The remainder spend 52 per cent of their time in duties related to safety.

3. Plants employing between 500 and 1000 people, 60 per cent have full-time safety engineers; in the rest they spend an average of 78 per cent of their time in safety.

4. Full-time safety engineers are employed by 77 per cent of plants with over 1000 people, while the rest have men who devote about 83 per cent of the working day to safety.

Altogether, the safety engineer in a bigger plant is accustomed to shouldering a larger burden of responsibility.

Getting along with people

The overwhelming majority of the safety engineers interviewed and surveyed singled out the ability to get along with people as their most valuable asset. They believe that 86 per cent of all accidents are either directly or indirectly caused by the human element. Next important, a good safety engineer should be an able administrator and should have a thorough knowledge of the technical aspects of the plants in which he works.

Most safety engineers believe that to do a good job, a safety engineer has to have the solid support of management and a supervisory force that will cooperate in selling his program.

The same idea has been expressed by the U.S. Bureau of Mines after a five-year study of safety programs with the conclusive advice: If you want to make a safety campaign in industry work, be sure top management participates in it.

This fact is obvious when you compare figures. The Bureau of Mines found that companies whose top officials took an active part in a safety program had 5.3 lost-time accidents per 1,000,000 man-hours; the term "top officials" includes both management and union. However, on similar operations, where no top officials participated in the program, there were 128.7 lost-time accidents per 1,000,000 man-hours.

Duties of the safety engineer

The safety engineers interviewed by *Chemical Week* had rather concise ideas of a safety engineer's duties.

First, he must know plant conditions and keep management informed. He must also have first-hand knowledge of the workers and their particular problems. To accomplish both, he spends a good deal of his time inspecting the plant and talking to the workers.

He must educate employees in the fundamentals of safe operating procedures. Consequently, another large part of his time is devoted to teaching workers, particularly new ones.

Furthermore, he has to keep up-to-date and rectify unsafe conditions before they become major problems. He accomplishes this through safety meetings with management and with plant safety committees.

Safety experts point out that small plants, by and large, have more frequent and more severe industrial accidents than big plants. They want small plants to devote more attention to safety problems, and they empha-

(Continued on page 174)

Solubility nomograph for chlorine dioxide

D. S. DAVIS

Professor of Chemical Engineering
Virginia Polytechnic Institute

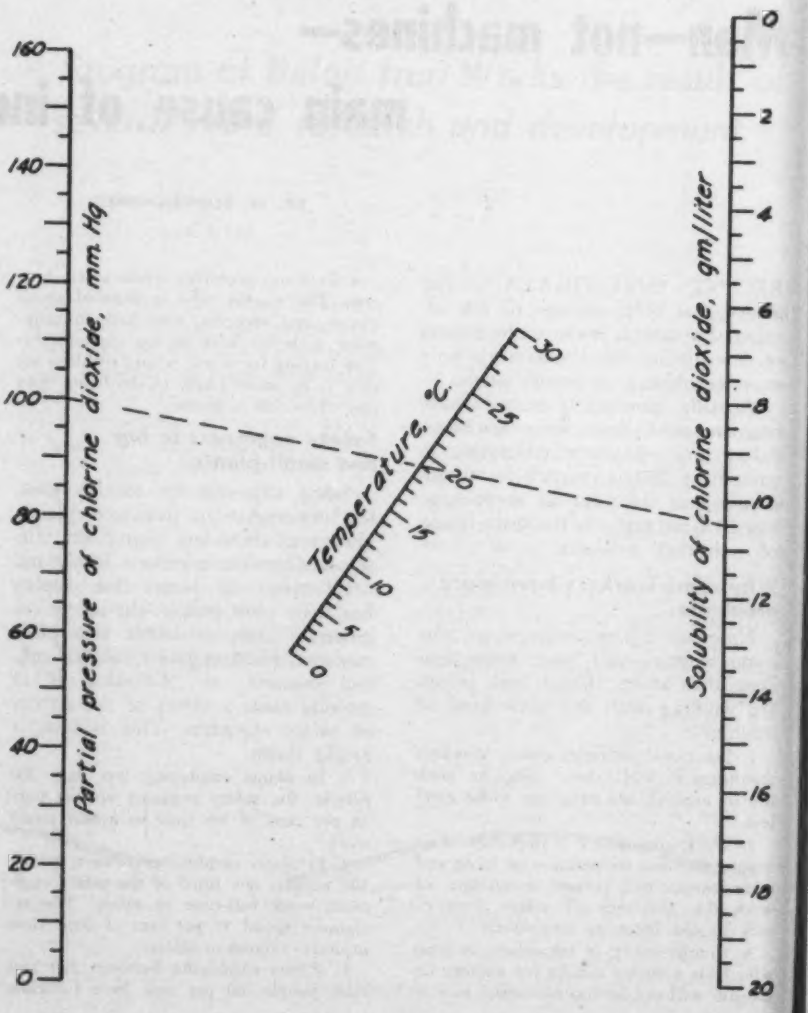
RECENT DATA reveal that the solubility of chlorine dioxide in water is linear with partial pressure at temperatures of 0° to 30°C. The accompanying nomograph greatly extends the utility of the original data and of the previous graphical treatment, since it permits one to make accurate interpolations along closely graduated scales.

The use of the chart, which was constructed by means of methods (1) described previously, is illustrated as follows: What is the solubility of chlorine dioxide in water at 19°C. when the partial pressure of the gas is 100 mm. of mercury? Connect 100 on the partial pressure scale with 19 on the temperature scale and note the intersection with the solubility scale at 10.5 grams of chlorine dioxide per liter of water.

What is the partial pressure of chlorine dioxide over an aqueous solution that contains 7.0 grams of gas per liter of water at 17°C? Connect 7.0 on the solubility scale with 17 on the temperature scale and read the desired partial pressure as 60 mm. of mercury.

At what temperature is the partial pressure of chlorine dioxide 140 mm. of mercury over an aqueous solution that contains 14.0 grams of the gas per liter of water? Connect 140 on the partial pressure scale and 14.0 on the solubility scale and read the temperature as 20°C.

The index lines for the last two illustrations are not shown.



Literature Cited

(1) Davis, D. S., "Nomography and Empirical Equations," Chap. 10, New York, Reinhold Publishing Corp., 1955.

Continuous vs. batch pulping

Questions and answers based on papers presented at the Fourth Annual Paper Conference, University of Florida

Answers to questions on continuous vs. batch pulping in this issue are provided by: J. M. Loving, West Virginia Pulp & Paper Co., Covington, Va.; Edward Law Jr., Waldorf Paper Products Co., St. Paul, Minn.; Peter Borlew, National Container Corp., Jacksonville, Fla.; Frederick Wierk, Reynolds, Smith & Hills, Jacksonville, Fla.; W. J. Nolan, University of Florida, Gainesville, Fla.; and L. E. Eberhardt, Bauer Bros. Co., Springfield, Ohio.

Continuous pulping — operation

Q. What foaming difficulties, if any, are experienced following the defibrator as pulp is discharged?

A. (J. M. Loving) The pulp being discharged from the defibrator is, of course, blown directly into a blow tank. This is done at pretty high consistency so that there is no foaming difficulty at all. The pulp from the blow tank is then pumped into a regular Sutherland box and passes through the circulating pump into the Sutherland and Sprout Waldron. Again, we have no foaming difficulty either in the Sutherland itself or in the washer vat. The semichemical pulp gives us no foaming trouble at all, but on the paper machines they say they do have trouble. They don't know what is causing their trouble. We don't know what is causing it either so I can't give you a direct answer except to say that we don't have any trouble with foam with the semichemical.

Q. What kind of defibrator did you use on monosulfite?

A. (Mr. Loving) In all four cases we used the Asplund, type D defibrator; with the enlarged segments.

Q. Talking about rotary feeders, I believe you mentioned that you put in grooving in order to get a better seal. I wonder if you could expand on this.

A. (Mr. Loving) Of course, this was done by American Defibrator, the manufacturer. I can't say whether it has done any good as yet, because the thing has only been in operation for a month. This is on the new unit. Frankly, the same sort of grooving was on the 18 inch rotary valve originally installed with the M and D unit and I don't believe that the idea is particularly a good one.

Q. Did the screw feeder and its pressure seem to deteriorate the strength of the pulp?

A. (Mr. Loving) No.

A. (from the floor) Hardwoods are not injured by the pressure of the feeder. In fact, the screw feeder may, possibly, help by opening up the chips and splitting them longitudinally.

A. (Mr. Loving) We couldn't get by on our small units with rotary valves, not at 9½ min. and 78 lbs., without the screw feed.

Q. There seems to be some benefit from it?

A. (Mr. Loving) Yes, we think so.

Relative costs

Q. All other things being equal, how does the cost per ton of batch type pulp compare with the cost of continuous pulp?

A. (Mr. Loving) I assume the question does not mean fully cooked continuous pulp. I'm afraid I can't give a very good answer on that but my guess would be, and I hope that I'll be corrected if somebody disagrees with me, that the pulp as we produce it is probably 50 per cent of the cost of the full chemical cook.

A. (Edward Law Jr.) I might have an answer to that. We made semichemical pulp for years in rotary digesters and now we're using continuous cookers. I don't have the figures as to our actual maintenance costs of continuous vs. rotary cookers. But where we had to have three men on the rotaries we now have one man. So there's quite a saving in labor and, I might also note, there's quite a saving in power. I do not have any actual calculated figures available.

Q. I'd like to ask Mr. Loving what he figures his steam requirements are per ton of pulp.

A. (Mr. Loving) About a pound per pound. We used to think it was about 0.8 lb., but it's a little more than that now since we have put in continuous discharges. I think a pound per pound is a pretty good figure.

A. (from the floor) We figure about 1600 lb. steam per ton of pulp. But it is surprising how that figure depends on the maximum temperature of the cook. If you're cooking to 100 lb .pressure you will use a lot less steam than if you are cooking to 170 lb.

A. (Peter Borlew) There is one very important point in this question and this is yield. If you compare costs per ton you have to also figure that, if the yield is higher in semichemical, the overall costs are much lower. So, one cannot say, "everything else being equal", in comparing costs. The most important and crucial question right now in our industry, because of the high cost of wood, is how to get more out of the wood. So no matter what the slight differences in operational costs might be in continuous cooking, if we can get more yield from the wood, we are definitely better off. Now that goes for semichemical continuous cooking but I'd like to hear something about kraft.

A. (Frederick Wierk) This comment will necessarily not be specific because there is nothing specific about the question. Since the inception of the chemical industry, and the process industries generally, it is reasonably well known that anything that can be done batchwise can, somehow, be done better continuously. I don't think there should be any question, fundamentally, as to batch vs. continuous operation. If you recall the his-

tory of paper making, the sheets themselves were first made in batch by hand. Now we make them continuously. Then we go back farther in the process and pulps were beaten in batch. Now we run the pulp through continuously. New we are talking about cookers. There is no reason why exactly the same end results from the same raw materials cannot be produced either in batch or continuously.

Q. (Mr. Borlew) The fact of maintenance cost may enter to a much greater extent with continuous cookers.

A. (Mr. Wierk) That is a matter of design detail and not a matter of basic principle.

Q. (Mr. Borlew) Stainless steel, monel and other expensive alloys for the reaction chambers and accessories and the wear and tear which kraft liquors may exert from a chemical point of view vs. neutral sulfite may affect the costs of operation. I don't know whether they do or not. I am asking the question, is that an important point or not? Your cost of operations may go up sky high through maintenance.

A. (Mr. Wierk) Wouldn't you have the same problem as to metallurgy and corrosion whether your process is continuous or batch?

A. (Mr. Borlew) We know more or less how bad corrosion is in batch digesters. We don't yet know, but rather, we got an idea yesterday, how bad it could be in continuous digesters.

A. (Mr. Wierk) Again, that's matter of design.

A. (Mr. Borlew) We are talking about costs now, operational costs into which maintenance will enter.

Q. Per ton of capacity what would be the comparative costs of a batch digester vs. a continuous digester?

A. (Mr. Law) We considered going to rotary digesters and weighed both factors. I don't remember the exact figures but I recall that a 16 ft. rotary digester of stainless steel cost around $100,000 and a continuous cooker did not cost much more than $150,000 or $200,000. The continuous digester would push through 150 to 200 tons, so, as far as we were concerned, there was just no comparison.

Relative pulp quality

Q. How does the quality of continuous pulp compare with that from batch?

A. (Mr. Loving) I am not qualified to answer that because we have never run any batch pulp for 9 point.

A. (Mr. Law) I think it is a matter of opinion. A lot of people today are making semichemical in batch digesters and are refining it in Sprouts and Bauers and there are a lot of people who make good pulp in continuous digesters. Actually, as far as the quality of the 9 point board is concerned, I really don't think there is too much difference.

A. (Mr. Wierk) To the extent that you can control your conditions by either system it should be noted that, from a practical consideration, your continuous process, in whatever category you establish, is bound to ultimately produce a more uniform quality. In any continuous process, your variables are subject to prompt, immediate response and control. With the continuous process you can get your answer in a matter of minutes where it would take hours to get it out of a batch operation.

In carrying out any chemical operation continuously, you improve the end result by introducing into the system a desired condition of normalcy.

Q. Based on your data presented this morning, the slow bringup with mill chips makes the better pulp. What data do you have to support the rapid cook?

A. (W. J. Nolan) We have no data in which viscosities are incorporated in the work, because that is quite recent. In our past work, we have had rapidly cooked pulp that had about the same physical strength as the batch cooked. And we had screen yields of 48 per cent. That, now, is based on oven dried pulp per pound of oven dried wood, which is somewhat higher than the air dried basis. In our past experience we have made pine cooks that were as high or a little higher in yields than the batch type and they have been just about as strong. In fact, they have been stronger in tear strength. In addition, and this I think is quite important, in our evaluation, we compared our results to batch type cooks which were made in our laboratory digesters. I am quite sure that we had a more uniform batch pulp and a better quality pulp than you get in one of these 9-12 ft. diameter monstrosities. So, on the basis of that, I think we have evidence that we can make just as strong a pulp with just as high or possibly higher yield than you will get commercially in batch cooking. In vertical digesters you can't get the uniform quality, regardless of the cooking conditions. The mechanical features of a large vertical digester call for nonuniformity of pulp.

Scope of continuous pulping

Q. My experience has been entirely on the making of kraft by the batch system. So far I have not found any manufacturer of continuous digesters who will come right out and say their equipment is suitable for cooking kraft liner. They all say they can make good corrugating. They all say they can make good semichemical. I would be interested to hear what they have to say on kraft cooking.

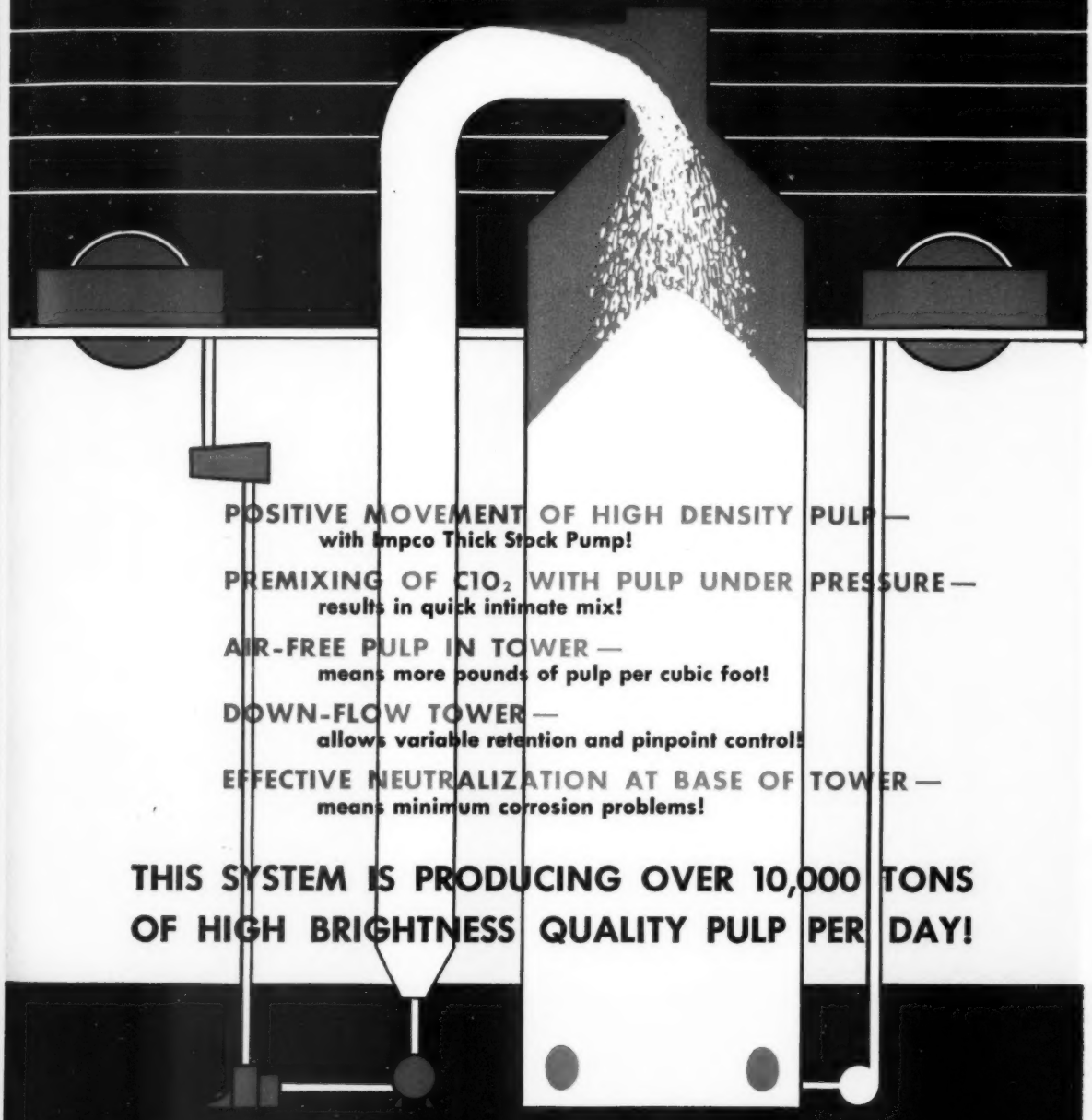
A. (L. E. Eberhardt) Actually, I'm in the manufacture category, but as yet our mill experience has been very limited. However, we have done a great deal of work with our semi-commercial laboratory units at Springfield. I am firmly convinced from the results we have obtained there that you can make any desired type of pulp from any kind of wood with continuous, high temperature methods. Such pulps are equal to or improved over those produced with conventional equipment. The equipment which we have will handle steam pressures up to 300 lb. and our experience has been that, in working with short cycles and high pressures, the problem is one of keeping the yield high. Things happen so fast at extreme pressures that it is a problem to adjust all of your conditions so that you can get a pulp of high yield. I am firmly convinced that, with the methods discussed, any type of pulp quality can be produced.

Q. What I am anxious to find out is whether there is a mill in which it is actually being done.

A. (Mr. Eberhardt) I think the reason why continuous equipment has been applied mostly to semichemical and higher yield pulps is because that's where there has been a lot of new expansion. The older mills, with their high capital investment already made in equipment, are obviously going to utilize that equipment until loss of economy and savings makes them obsolete. I think that anyone who was going to build a new kraft mill would have to consider the various pulping methods very carefully. However, the history of the paper industry has been that there has always been reluctance to pioneer new methods. If someone will install the first unit and make it work, then everyone jumps in.

(Questions and answers will be continued in the next issue.)

Impco chlorine dioxide bleach system



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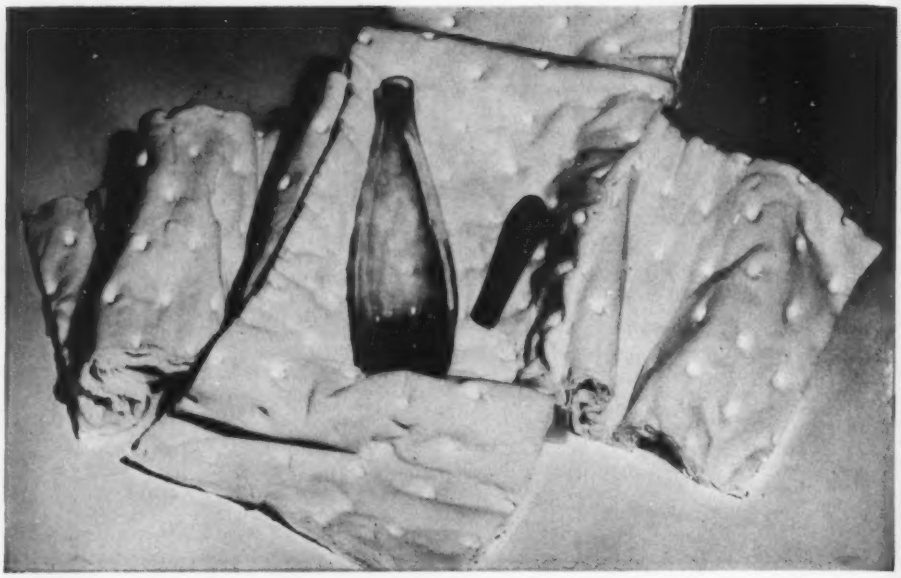

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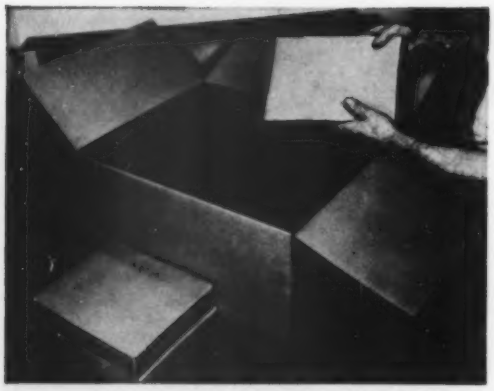

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CURRENT COMMENTS

Conventions . . . newsprint famine . . . federal intrusion

New products and uses, more efficient marketing and better utilization of raw material promised well for the industry as three April conventions looked to the future.

The National Paper Trade Association held its spring meeting at the Waldorf Astoria, New York, as a merchandising companion piece to the manufacturers' convention in February. The NPTA featured an exposition of paper industry products, while the manufacturers confined their convention programs to internal development problems. Several floors of the hotel were taken over by exhibitors with emphasis on the use of plastics in combination with paper for packaging, merchandising, and ideas for wider household use of paper.

The manufacturers devoted their official sessions to the changing conditions in the industry and a search for more efficient methods of selling their products to the public at a time when paper is in short supply. Selling what is now available, but looking to future broader markets, was the keynote of many of the speakers.

At Atlantic City the American Management Association staged its annual packaging exposition. Packaging of all types of commodities was displayed, with principal emphasis on food packaging. A battle royal was in evidence between the paper, plastic and foil manufacturers for the attention of the food industries. Packing of everything from frozen fish to cheese was demonstrated by the competing industries, and the glass jar and tin can people were not idle. The plastics people argue that the transparency of their product is of sufficient importance to justify its consideration in comparison with the cheaper paper wrappings.

Such groups as the producers of glassine and greaseproof papers were vehemently denying that theirs is a vanishing industry, being displaced by films and foils. That the paper people are anything but pessimistic about the future of their industry has been demonstrated by the investment by an old-time greaseproof paper company, Rhinelander, in combination with the huge Weyerhaeuser timber and pulp interests, in millions for the building of a new modern mill on the Pacific coast.

Paperboards, especially of the construction type, came to the attention of the Northeastern Retail Lumber Manufacturers Association. This convention was told that its future is tied closely to maximum use of forest products. The use of sawmill waste for paper production and for the new type of "particleboard" was strongly urged on the lumbermen by experts from the lumber research agencies.

Newsprint needs

The future of the paper industry came to the fore in a report to Congress on the need for additional newsprint-making capacity. Figures released by the Department of Commerce indicate a shortage of at least 40,000 tons for 1956, not all of which can be provided by additional imports from Europe. The figures show an estimated requirement of 6,850,000 tons against an apparent supply of 6,810,000 tons. Advertising in the first half of the year appears to be reaching a new high in space sales, and the coming presidential campaign is expected to add to the demand for paper for advertising space for candidates and editorial coverage.

Estimates of 1956 capacity indicate that by the end of the year nearly 3,000,000 tons will have been added to paper and board production by the installation of new machines, but comparatively little of this will be in the newsprint field. The major development will be in the use of southern pine for the kraft industry.

The demand for newsprint is resulting in increasingly heavy imports from European mills not usually important factors in the newsprint shipping field. Increasing shipments are being made from West Germany and Austria in addition to the normal shipments from Scandinavia, also being increased. The shipments are at amazingly high prices, indicative of a partial famine: some of the imported paper is as high as $150 to $180 per ton, compared with the contract Canadian and domestic mill prices of approximately $125.

Federal loans

The domestic industry has come out in opposition to a proposal from Minnesota that a new "Depressed Areas Administration" be established in government to put the federal government in competition with private industry through grants of special loans. The industry takes the position that it is already investing capital to build new mills or enlarge existing plants to any extent that the nation's economy demands. The proposed bill would, it is argued, place the federal government in competition with private enterprise. That the paper industry was specifically included in the proposal of the measure's sponsor came out in testimony before a Senate committee.

It is argued that federal intrusion into the field of private enterprise would not relieve a shortage situation or provided needed employment in depressed areas, but rather would discourage the investment on a larger scale of private capital and thereby actually defeat the aim of the proposal.

That the paper industry believes in its own ability to provide the nation's newsprint was shown on April 10 when both International Paper Co. and Union Bag & Paper Corp. announced plans for the building of new newsprint mills. John H. Hinman, chairman of the board of International, announced plans for the building of a newsprint mill at Pine Bluff, Ark., at a cost of $57,000,000. This will begin production of kraft board at a rate of 165,000 tons a year late in 1957 and before the end of that year will produce newsprint at the annual rate of 130,000 tons. The Union Bag & Paper project was announced by Alexander Calder at the company's annual meeting as a program to be initiated within six months. The details are not yet decided. International's expansion plan will more

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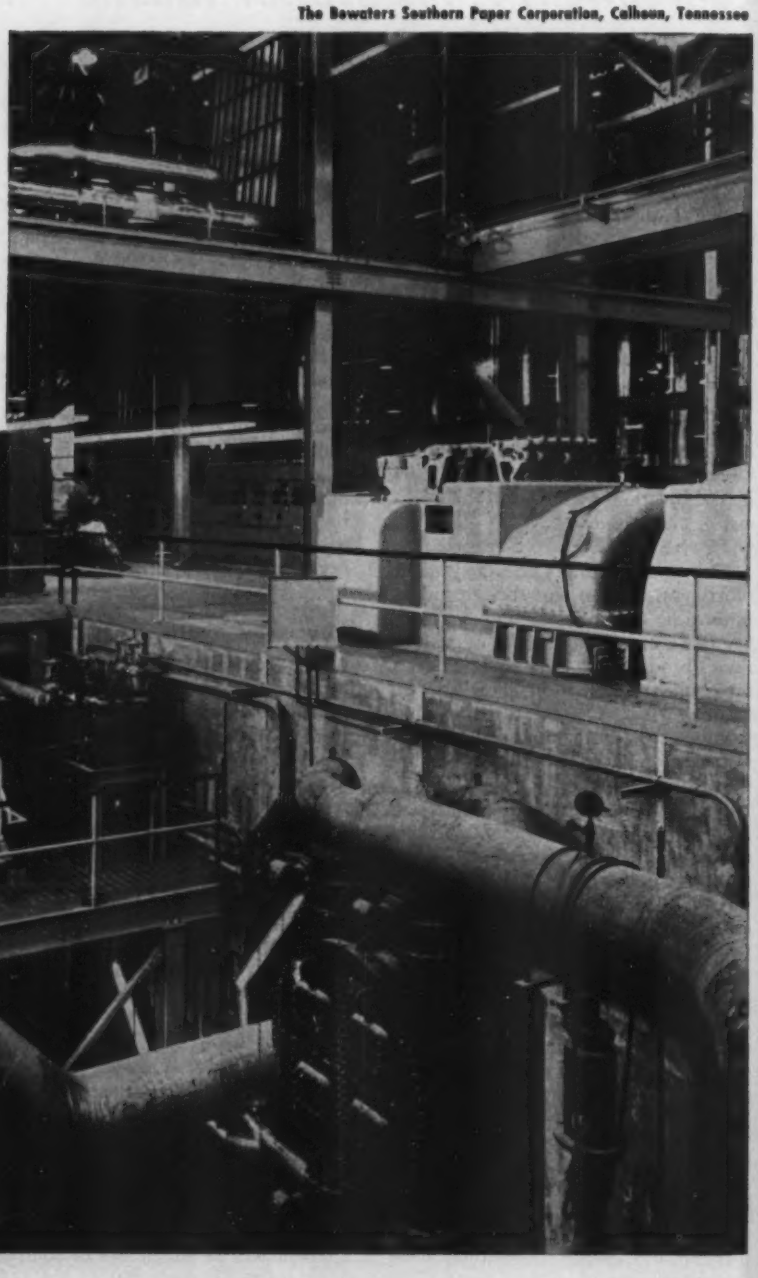

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Current comments . . .

than meet the Department of Commerce estimate of a 40,000-ton annual newsprint shortage, but with the growing demand will not much more than balance production with consumption by the end of 1957.

Financial Reports

Despite variations in securities prices since the first of the year, paper mill issues continue in the "blue chip" area, remaining reasonably steady despite fluctuations in other industrial fields.

Net Incomes

Consolidated Paper Co.—Net income for 1955 was $1,672,410 as compared with $1,022,990 in 1954.

Container Corp. of America—Net 1955 income was $15,703,399 as against $13,604,232 in 1954.

Eastern Corp.—Net 1955 income was $1,251,323 as compared with $974,659 a year ago.

Hammermill Paper Co.—Net income in 1955 was $2,771,214 as against $1,637,379 in 1954.

KVP Co.—Net income for the last quarter of 1955 was $944,371 as compared with $543,889 in the same quarter of 1954.

Keyes Fibre Co.—Net 1955 income was $1,463,148 as compared with $1,447,018 in 1954.

Mead Corp.—Income in 1955 netted $10,642,000 as compared with $5,512,792 in 1954.

Minnesota & Ontario Paper Co.—Net 1955 income was $7,400,000 as compared with $6,067,370 in 1954.

Morris Paper Mills.—Net 1955 income was $908,641 as compared with $982,882 a year earlier.

Oswego Falls Corp.—Net 1955 income was $2,115,696 as against $1,703,666 a year ago.

Oxford Paper Co.—Net income for 1955 was $3,704,000 as compared with 1954 earnings of $3,188,418.

Rhinelander Paper Co.—Net income for the fourth quarter of 1955 was $501,713 as compared with $388,145 for the same quarter of 1954.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	April 10, 1956	March 9, 1956
A.P.W.	*5¾-6	5⅞
Celotex	44	39
Same Pref.	*19-19½	19⅜
Certain-Teed	29	27⅞
Champion P & F	74½	74
Same Pref.	*105½-106¾	107
Chesapeake Corp.	39 (New)	69¾
Container Corp.	79	73¼
Same Pref.	*102-104	103
Crown Zellerbach	66	59¼
Same Pref.	*102½-103¼	103½
Dixie Cup	53¾	54¼
Eastern Corp.	33	32½
Federal Paper Board	34	33⅜
Robert Gair	32½	33⅜
Same Pref.	110	110½
Great Northern	99	95½
Hammermill	40¾	38⅜
International	133	123¼
Same Pref.	*102-104	106
Kimberly-Clark	54¾	47¼
MacAndrews & Forbes	44	44¼
Marathon	43½	39⅜
Masonite	46½	40¾
Mead Corp.	76½	75½
Same Pref.	102½	101½
Same Sec. Pref.	*84½-86	84
Minnesota & Ontario	37½	36
National Container	27	25⅛
Same Pref.	47	45⅝
Oxford Paper	45	44⅛
Same Pref.	*100-101	101
Rayonier Inc.	38½	38⅞
Rhinelander	46¼	47½
Scott Paper	68¾	75
Same $3.40 Pref.	94	93
Same $4.00 Pref.	*103-105¾	105
St. Regis	47⅛	48⅛
Same Pref.	—	104⅛
Sutherland	45½	48⅝
Union Bag & Paper	41	34¾
United B. & C.	26½	25½
United Wallpaper	2⅜	2½
Same Pref.	*21-22½	24
U. S. Gypsum	69¼	64¼
Same Pref.	176	179
West V. P. & P.	55½	54
Same Pref.	105	106½

New York Stock Exchange — Bonds

A.P.W. 5%	80½	—
Celotex 3¾%	—	—
Champion P & F Co. 3¼%	99	97
Mead Corp. 3%	—	—

American Stock Exchange — Stocks

American Writing	22¼	21
Brown Co.	23⅞	21⅛
Puget Sound	71	71

*Closing Bid and Asked Prices.

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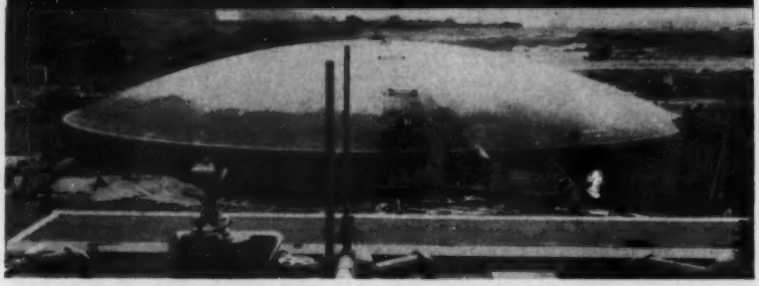

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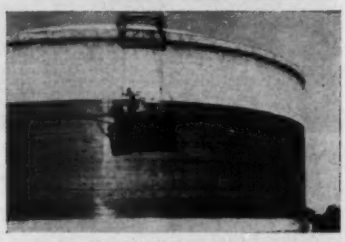

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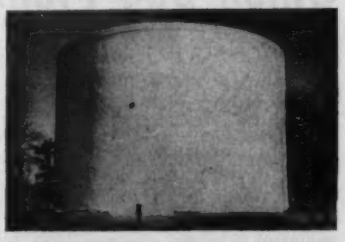

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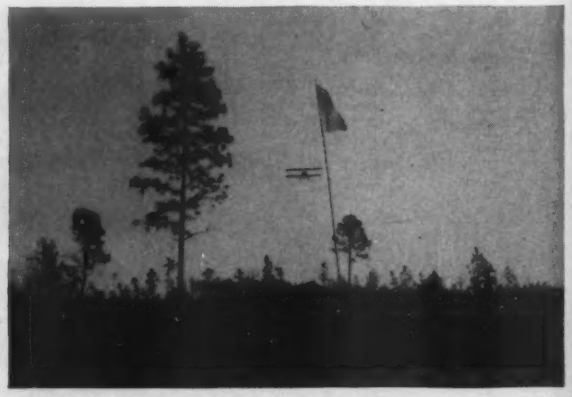
NEWS of the INDUSTRY

MAPS ARE CONSULTED prior to an experimental flight. At the right is J. W. Johnson, who heads Union Bag Research

SPECIALLY TREATED pine seed is dumped into the plane's hopper by Pilot Russ Hilton of Savannah's Scott Air Service

SPREADER ON PLANE'S belly required the attachment of a specially rigged regulator for conversion from crop dusting



BRIGHT ORANGE flag held by a member of the ground crew shows the pilot where to stop his flow of seed in experimental run

Union Bag Plants Pine by Air in Southland

FORESTERS AT Union Bag & Paper Corp. are giving a modern twist to one of Mother Nature's oldest chores — planting pine seeds by air. They are using airplanes.

While the project is yet in the experimental stage, foresters are hopeful that the project will prove to be the answer to the perplexing problem of quickly and efficiently seeding large areas of idle southern land.

Sowing pine by plane is done in much the same way as crop dusting, the hopper being filled with de-winged seed. As the plane reaches the designated area, the pilot releases a valve. The seeds fall in an even, regulated flow.

Experiments in airborne reforestation are being carried out by Union Bag's Research Department under the direction of J. W. Johnson. Speed, he says, is the primary aim of the Savannah, Ga. firm's project.

Foresters estimate that a man with a hand-operated planting tool should be able to plant an acre per day to pine seedlings. Two experienced men with tractor and mechanical planter should average about 15 acres daily.

On the other hand, during a recent experiment on Union Bag land, an airplane equipped with hopper sowed 200 acres in about 45 minutes.

Adjustment on the Belly

The plane used is a Stearman two-seater. The front cockpit has been converted into a large hopper. Ordinarily used for crop dusting, the plane required only a small adjustment to the spreader attached to its belly.

Flying at about 100 ft., the pilot spreads the seeds in strips about 60 ft. in width. Ground crews mark the beginning and end of each strip with large orange flags on 40-ft. poles. In recent experimental flights 100 lb. of seed have been carried per trip and distributed at the rate of 1 lb. per acre.

There are problems, as Mr. Johnson has pointed out. "We're coating the seeds with repellent," he says, "to make the birds and mice leave them alone; and we think that we've at least got this phase reduced to a size we can handle."

Then, too, there is the problem of proper distribution. Best growth results when pine is planted in stands that are neither too thick nor too sparse. Hitting the ideal balance is not easy when the seed is being sown at a speed of 100 mph.

Union Bag officials point out that it may be a year or more before it is possible to determine the success of the experiments.

Further Expansion Considered by Brown Co.

Expansion even beyond the $17,000,000 plant addition and improvement program announced in February has been reported by Brown Co. of Berlin, N. H. Company officials have told stockholders that "it may be appropiate for the company to extend its operations by the acquisition of productive capacity in addition to its present plants in New Hampshire."

Laurence F. Whittemore, Brown board chairman, declared that "we are actively negotiating in three different situations."

Brown has also announced that it has entered into an agreement with the Babcock & Wilcox Co. whereby B&W will license the New Hampshire firm to install its magnesium bisulfite pulping and chemical recovery process at the Berlin mill. This will be the first MgO installation in the eastern United States to recover both the chemical and heat values in waste sulfite liquor.

Babcock & Wilcox is the exclusive licensing agent for the magnesium-oxide chemical recovery system, which it developed in cooperation with Howard Smith Paper Mills Ltd. and Weyerhaeuser Timber Co. Weyerhaeuser Timber now has in operation at Longview, Wash., the first MgO installation.

The Brown installation will be completed in 1957 and will process 750,000 lb. of waste liquor solids every 24 hours. Designed to operate at 875 psi, the B&W boiler will produce 160,000 lb. steam per hour at 825°F.

NO. 7 MACHINE building under construction by Longview Fibre Co. in Longview, Wash. Building to the right is the new 75,000-sq. ft. storage and warehouse facility. Contractor for the machine structure (440 ft. by 65 ft.) and for machinery and equipment installation is Howard S. Wright Construction Co. of Seattle. Engineering work on machine installation is being carried out by company personnel under the direction of R. S. Wertheimer, vice president and resident manager

Machine Installation at Longview Fibre; Unit Called "Custom-Made"

WORK ON the recently announced installation of No. 7 machine at Longview Fibre Co. in Longview, Wash., is "progressing satisfactorily," according to officials of the firm. The fourdrinier, rated at 250 tons, is to be in operation by October.

The new unit, which will be operated at speeds ranging from 300 to 1500 fpm, will be an almost custom-made machine since Longview Fibre has placed orders for its component parts from most of the industry's leading machinery manufactures. Provisions are being made during installation for possible future speeds of up to 2000 fpm with the subsequent addition of vacuum transfer equipment. An increase in pulp production of 240 tons — corresponding to the increased production of the new fourdrinier — is underway.

Pulp Mill Expansion — The addition of three digesters is planned, bringing the total number of such units at the kraft mill to 14. Each of the digesters, all lined with carbon brick, will blow approximately 12 tons. Other new equipment at the pulp mill: an Oliver washing system, two Cowan screens and a Buffalo Vac 400-ton evaporator.

A power plant expansion program includes a new direct-fired boiler rated at 830 psi and 350,000 lb. per hr. A General Electric Co. 20,000-kw turbo-generator is also to be installed.

Stock Preparation — A complete stock preparation system has been ordered for the new machine, including two Bauer Series 440 refiners, one No. 5 Miami jordan, one No. 2 Clafflin refiner for machine broke and a 90-in. disc Hydrapulper. The latter, a 20-ft. tub unit, will handle dry end broke and is to be placed beneath the calender stacks and reel.

Wet End — The machine is to have a standard Rice Barton removable fourdrinier. Wire size is 180 in. by 126 ft. The unit will be equipped with two Valley head boxes, one primary and one secondary.

The fourdrinier section will include six oscillating suction boxes and two 25-in. Rotabelts. The fourdrinier will have 25 table rolls and a 40-in. diameter suction couch roll. There will be two 30-in. diameter suction presses and one 30-in. smoothing press. Fourdrinier and press sections are being furnished by Rice Barton, while Beloit suction rolls are being used.

Auxiliary equipment at the wet end will include a sufficient number of 620 Series Bauer cleaners to permit primary, secondary and tertiary stock cleaning at the machine.

Dryer-Section — The dryer section will consist of three sections. A Rice Barton creping press, consisting of two 30-in. top rolls and one 60-in. bottom roll, will separate the first and second sections. (The creping press is to be used for

watermarking, as a breaker stack and for conventional creping.)

A Rice Barton size press, consisting of two 30-in. rolls and a size press pan, will separate the second and third dryer sections. The first dryer section calls for twenty-one 60-in. diameter Bagley & Sewall dryers and one 36-in. lead-in dryer. The second section will contain 13 dryers and the third 11. The first section will have six 60-in. felt dryers, the second section four felt dryers and the third two. All units will be two high and equipped with a Midwest Fulton drainage system.

Longview Purchases Dry Solids Recovery Furnace

Longview Fibre has recently announced the purchase of a 2,000,000-lb. per day dry solids recovery furnace. To be designed and built by Combustion Engineering Inc., the unit is the largest currently contracted for by the kraft industry.

Less efficient older units will be shut down when the new furnace goes on the line sometime after mid-1957.

In addition to chemical recovery, the steam produced will be in excess of 300,000 lb. per hour. Design pressure is to be 975 psig at 750°F, with operating pressure of 850 psig at the superheater outlet.

The furnace hearth or fire box is square, with provisions to fire liquor from all sides. Multiple smelt spouts will be installed on opposite ends of the hearth delivery into two dissolving tanks. The "decanting" furnace bottom will permit the withdrawal of smelt from opposite ends of the hearth.

Tangential secondary air will be utilized. The draft fans will be sized to amply supply the needs of the large combustion load. The forced-draft fan will require an input of 400 hp, while the induced-draft fan located after the precipitator will require an input of 1000 hp.

Platen type superheater and furnace screens precede the "baffleless" boiler. IK soot blowers will keep the surface clean.

Flue gases will pass through in separate cascade evaporators installed on two levels. The gas will travel parallel, but the black liquor will move through the cascades in series. The cascade drive will be through a traction coupling..

The fans, forced and induced, will be equipped with hydraulic couplings, as will the black liquor pumps serving the liquor sprays.

Calender Stack, Reel and Winder — The dry end of the new machine will boast two Bagley & Sewall calender stacks, each containing eight rolls — one 30-in. king roll and seven 14-in. regular rolls. The two calender stacks will be separated by a B&S 60-in. calender dryer.

Plans for the dry end also call for the installation of a Black-Clawson Airoflyte fully automatic reel designed for 90-in. rolls. A 5000-fpm winder is being furnished by Beloit Iron Works.

Machine Drive and Auxiliary Equipment — The prime mover will be a General Electric steam turbine with line shaft and Rice Barton differential units on each section.

Miscellaneous equipment will include three DeZurik consistency regulators, an Oliver saveall, eight Foxboro magnetic flow meters at the wet end, a Beckman automatic pH control and Mason-Neilan moisture control instruments.

J & J Rogers to Build Colorado's First Newsprint Mill

J. & J. Rogers Co. of AuSable Forks, N. Y., will construct Colorado's first newsprint mill. The $5,000,000 operation will be located at Silt, near Glenwood Springs, and is expected to be in production well before December 1957.

J. & J. Rogers was the successful bidder for 3,000,000 cords of timber from 275,000 acres in two national forests. The transaction involves $9,750,000. According to the U. S. Forest Service, it was the largest such timber contract ever granted in the continental United States.

The timber is dead — mostly beetle-killed — and will come from the White River and Routt national forests. The New York firm's high bid was $3.25 per cord. According to David W. Wollin, president of J. & J. Rogers, the site has been purchased, and preliminary planning is underway.

Also competing for the contract were Allied Paper Co. of Kalamazoo, Mich., (a division of Thor Corp.) and How Lea Corp. of Lansing, Mich. The New York firm initiated the negotiations.

St. Regis Calls Purchase of Rhinelander "Assured"

St. Regis Paper Co. has reported that the acquisition of Rhinelander Paper Co. has been "assured" by deposits of the required "over 80 per cent" of Rhinelander common stock shareholders.

St. Regis has extended from April 16 to May 16 the deadline for remaining Rhinelander shareholders to take advantage of the share-for-share exchange. The Wisconsin firm, under the proposed purchase, will maintain its present organization as a St. Regis subsidiary.

Recent Expansions in the Industry

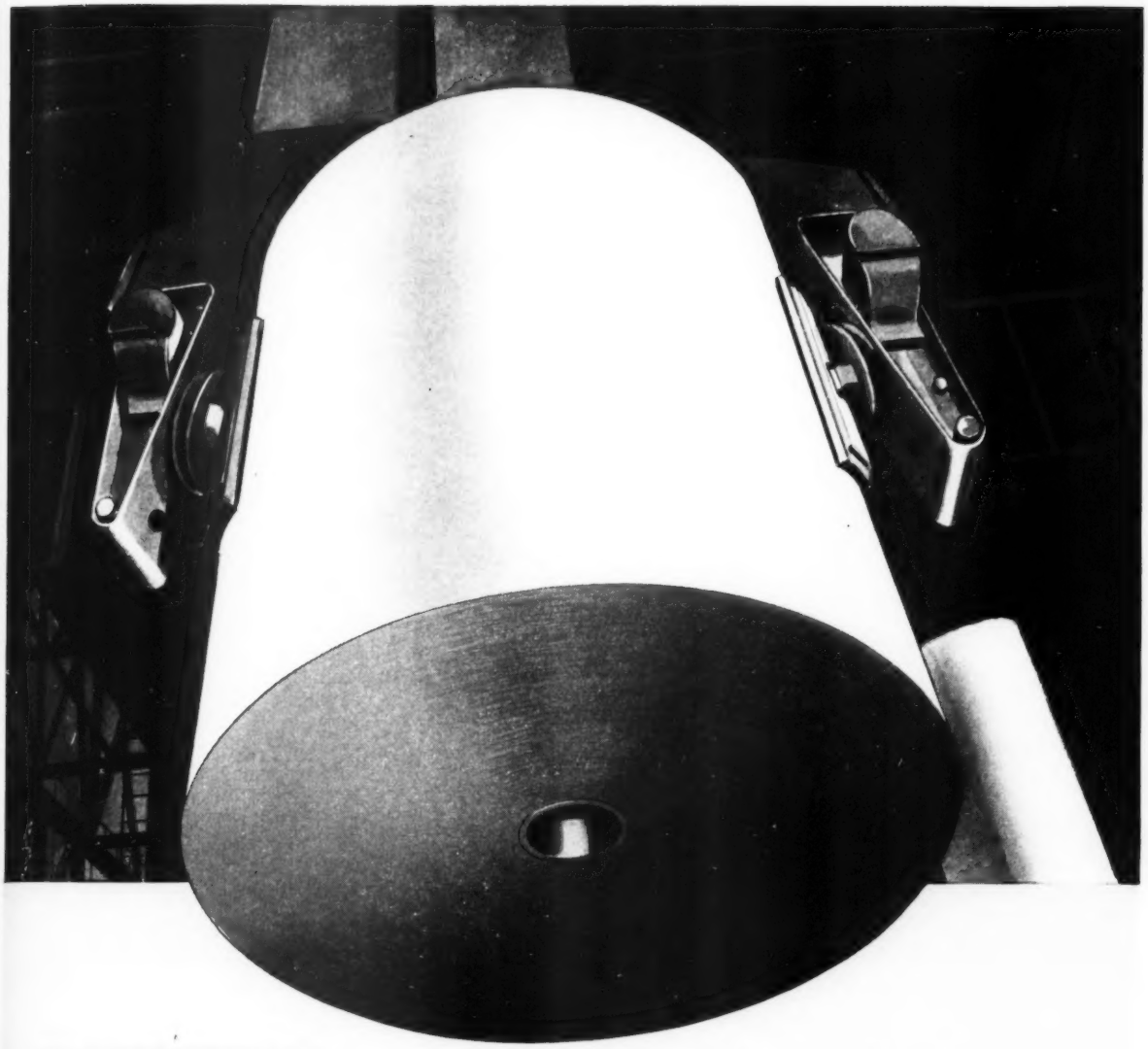
Crown Zellerbach Corp.
plans the installation of a $2,000,000 kraft recovery furnace at its Camas, Wash. mill. The unit, which will have a daily capacity of 350 tons, will double the mill's present recovery boiler facilities. Operation is expected early next year.

Continental Paper Products Ltd.,
converting subsidiary of Canadian International Paper Co., will build a plant in Saskatchewan to manufacture multiwall bags. According to Vernon E. Johnson, president of both firms, the $750,000 plant will be the first of its kind between Winnipeg and Vancouver.

St. Regis Paper Co.
will begin manufacture of multiwall bags at its new Kansas City, Mo. plant early this summer. Kraft paper will be supplied by company mills in Florida. Two production units will be in operation at the Kansas City plant.

Diamond Match Co.
will construct a completely integrated forest products manufacturing plant at Red Bluff, Cal., at a cost of about $15,000,000. In addition to facilities for processing lumber (including a sawmill, drying kilns and a planing mill), the new installation has been designed to include a molded pulp plant that will convert lumber and wood residues. The latter will use mechanically produced groundwood and will have an initial rated capacity of 30,000 tons per year.

Sidney Roofing & Paper Co. Ltd.
will close its Victoria, B. C. operations and move into its new $5,000,-



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CHECKING STREAM pollution is a principal goal in the installation of a saveall system at the Nekoosa, Wis. mill of Nekoosa-Edwards Paper Co. The basement view at the left shows the stainless steel seal box, the five pumps required for operation and various piping and valves involved. At the right, a Nekoosa maintenance man makes disc adjustments on the new Dorr-Oliver unit

New Saveall for Nekoosa No. 9 Machine

In order to reduce fiber losses to the sewer and as a further step toward the alleviation of stream pollution, Nekoosa-Edwards Paper Co. has installed a high density saveall system on the No. 9 machine at its Nekoosa, Wis. mill.

The Dorr-Oliver Inc. unit is of the disc type rather than the drum type in wide use in Nekoosa-Edwards mills. According to George Reynolds, chief design engineer for the firm, "the decision for its selection was made after giving careful consideration to such factors as existing space limitations, the flexibility of control and the efficiency of operation."

When in full operation, the D-O saveall will process approximately 350 gpm of white water from No. 9's wire pit and will return the high-density reclaimed stock to either of two machine chests ahead of the jordans or the Modern chest in the beater room basement; while the clear water filtrate will be returned to the basement of the wet room for process use.

The system will be operated from a console unit near the saveall on the machine room floor. It will require nearly 30 valves, some fully automatic and some remotely controlled; five pumps handling a total of 1500 gpm, and seven motors delivering a total of 65 hp.

Mr. Reynolds notes that in spite of its many controls the saveall will operate with a minimum of attention after being adjusted to suit the desired conditions.

News of the Industry . . .

000 plant now under construction at Burnaby. The switch is to be completed by mid-1959. Some of the Victoria property may be retained for storage facilities.

Johns-Manville Corp.
will enter the hardwood field and has started construction of a 54,300-sq. ft. plant adjacent to its Natchez, Miss. insulating board operations. The new plant will have an annual capacity of 60,000,000 sq. ft.

Hearst Publishing Co.
interests were understood to be expecting proposals from the Nova Scotia government early in February in regard to plans for establishing a newsprint mill in the province. The chief unanswered questions were: price for power and steam and allocation of timber limits. The plant may have an initial daily capacity of 225 tons.

Hygrade Containers Ltd.,
a subsidiary of Canadian International Paper Co., has completed a $2,800,000 corrugated shipping container plant at Poite-Aux-Trembles, Que.

Hurlbut Paper to Build $3,500,000 Mill

A mill expected to cost about $3,500,000 will be built by Hurlbut Paper Co. of South Lee, Mass. According to President Edward A. Sitzer, it is hoped that the plant will be in operation by the end of next year or early in 1958.

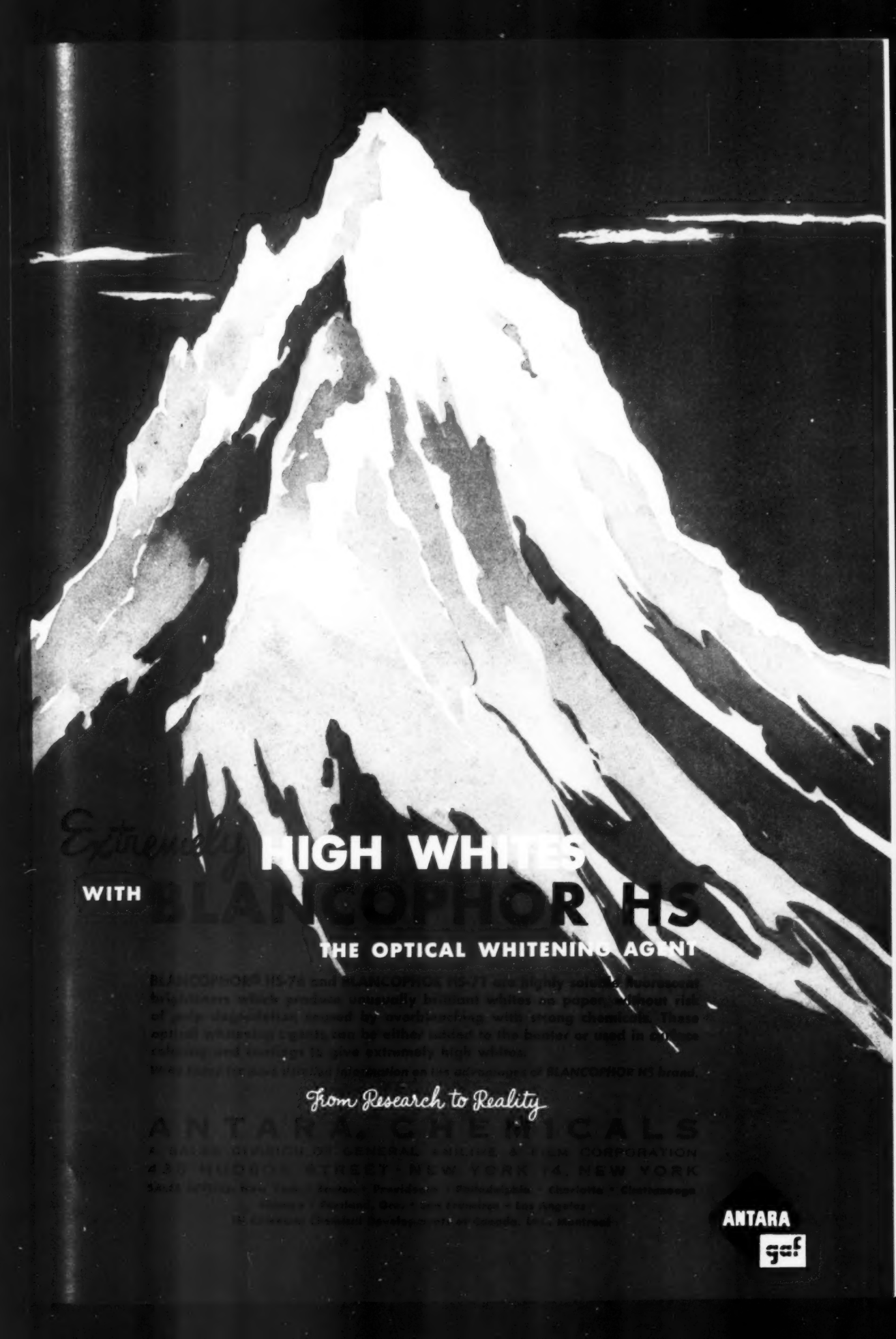
The proposed facility is part of an extensive expansion program now underway. Mr. Sitzer explained that the increase in production has been brought about by the increased demand for technical papers; also to provide manufacturing facilities for newly developed grades resulting from the extensive research program carried out by the firm over the past several years.

Hurlbut's research program has involved the possible use of the full range of synthetic fibers such as glass aluminum, silicate, nylon, dacron, etc. Already fairly large quantities of synthetic fibers are being used in production.

Eastern Plans $10,000,000 Kraft Pulp Mill in Maine

Eastern Corp. has completed preliminary plans for the construction of a bleached kraft pulp mill at Lincoln, Maine, to replace the bleached sulfite pulp unit now operated in conjunction with the firm's paper mill. The announcement follows detailed forestry and engineering studies extending over the past year.

The mill, which will produce a daily 175 tons of pulp, will be designed to use principally hardwoods, although some softwoods will be utilized. Timber growth surveys have indicated that there is adequate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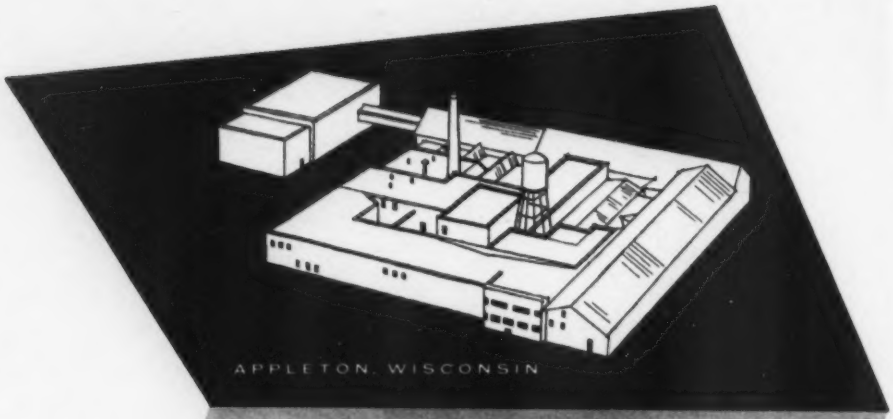

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INTERNATIONAL WIRE WORKS, MENASHA, WISCONSIN . . . AN AFFILIATED COMPANY SINCE JANUARY, 1955

IN A CONTINUING expansion program, Byron Weston Co. of Dalton, Mass., is regularly placing new equipment on the line. An example: this 55-in. Lawson hydraulic clamp cutter with electronic spacer. Recently, more than 3500 sq. ft. of mill storage area, 1200 sq. ft. of material receiving area and 7000 sq. ft. of shipping area have been added to the mill

timber available within a 50-mile radius of the mill site to supply the plant in perpetuity on a sustained-yield basis.

According to Harold Holden, president, the bleached kraft pulping process offers the firm manufacturing economies through recovery of chemicals. This is accomplished by concentrating the pulping liquor and burning it in a recovery furnace. The low-cost steam produced is used in the process and for generating needed electric power. In addition, the process permits the mill to take a larger portion of unbarked wood during off-seasons, thus reducing dependence on more costly sap-peeled wood. The kraft process also reduces stream contamination to a minimum.

It is estimated that the mill will cost approximately $10,000,000.

International Plans Multi-million Dollar Mill in Arkansas

A $57,000,000 newsprint and bleached kraft board mill will be built at Pine Bluff, Ark., by International Paper Co. Slated for completion by the end of next year, the plant will be the firm's second newsprint operation in the South. (International is currently building a $20,000,000 mill at Mobile, Ala., with completion scheduled for September.)

The Pine Bluff plant will have an annual newsprint capacity of 130,000 tons and will turn out bleached kraft board at a yearly rate of 165,000 tons. When added to the 115,000 tons of newsprint to be produced at Mobile, the new mill's output will bring to 245,000 annual tons the amount of newsprint produced by International in the South.

In February International reached an agreement with Olin Mathieson Chemical Corp. for the purchase of 395,000 acres of timberland in Arkansas, Louisiana and east Texas for $33,000,000. International has also opened six mechanized pulpwood concentration yards in Arkansas.

Japanese Alaska Mill Waits Only Financing

The Japanese government has approved the plan of a Japanese firm to establish a pulp mill in Alaska. Alaska Pulp Co. of Tokyo is preparing to set up a pulp factory near Sitka following recent United States government approval of the sale of 1460 acres of standing timber in the Sitka area to the Japanese company.

The mill, which will have an annual pulp capacity of 100,000 tons, will cost approximately $53,000,000, of which about $29,000,000 will be raised in the U. S. and the balance in Japan.

Alaska Pulp & Lumber Co., a subsidiary of the Tokyo firm established in Alaska under American law, will handle the raising of funds in the U. S. Of the $29,000,000, about $5,000,000 will be in the form of short-term borrowings. The remainder will be collected through Japan's first postwar private bond flotation in the U. S. It is understood that Dillon, Read & Co., the investment bank, will act as adviser.

The 100,000-ton mill at Sitka will help supply Japanese rayon manufacturing firms with about 50 per cent of their foreign pulp.

News of the Industry . . .

Consolidated WP&P Completes Mill Trial Using Local Hardwoods

A full-scale trial using local mixed hardwoods in the manufacture of semichemical pulp has been successfully completed by Consolidated Water Power & Paper Co. at Wisconsin Rapids, Wis.

More than 700 cords were used in the manufacture of neutral sulfite semichemical pulp during a 10-day run. The accomplishment marked the first time that a mixed hardwood neutral sulfite pulp had been used to produce enamel printing papers.

The success of the experiment opens a new pulpwood source close to the company's mills. In four nearby counties alone there are some 4,800,000 cords of hardwood on commercial forest lands.

"Our full-scale trial yielded an exceptionally high-quality pulp," according to L. W. Murtfeldt, assistant mill manager. "This will permit the pulping of mixed hardwoods on a permanent basis after the plant and facilities can be expanded and converted to accommodate the process."

It is estimated that Consolidated will use 12,000 cords of hardwood in 1956 if pulping on a permanent basis gets started by late summer. This supply is already in inventory.

Buckeye to Double Foley Capacity

A major expansion has been reported by Buckeye Cellulose Corp. at Foley, Fla. The wholly-owned subsidiary of Procter & Gamble Co. will double the capacity of its cellulose pulp mill, with completion expected in mid-1958.

P&G has appropriated more than $20,000,000 for the project. Production capacity will be increased to 240,000 tons per year, and pulpwood usage will increase to a daily 1700 cords.

The new facilities will give Buckeye a production unit that can be operated independently of the existing mill. High-quality pulp will be manufactured from either pine or hardwoods.

Engineering design work for the new unit will be by Lumus Co. of New York, N. Y., and Sargent & Lundy Co. of Chicago, working

closely with the engineering staffs of both Buckeye and Procter & Gamble.

New Quebec Mill to Utilize Wood Waste

Sawmill waste will help supply a 200-ton pulp mill that will be built near Thurso, Que., by Singer Sewing Machine Co. and Perkins-Goodwin Co. A new firm, in which Singer will have a 70-per cent interest, will operate the plant. It will be known as Thurso Pulp & Paper Co.

The estimated cost will be about $17,000,000, slightly lower than the average cost in the industry of approximately $100,000 per ton. This because railway and power facilities are already available.

Construction of the mill is to begin immediately, with completion scheduled for 1958. It is reported that the company may eventually enter the production of wrapping paper and cardboard containers. The mill is to be located near sawmill operations carried on by Singer at Thurso since 1926.

Cutting rights on 490,000 acres near Thurso is considered sufficient to sustain the mill in perpetuity. Used in production will be about 60 per cent bleached hardwood and 40 per cent bleached softwood.

Container Corp. to Build in West Germany

Container Corp. of America has embarked on the greatest expansion program in its history, according to Walter P. Paepcke, chairman of the board. Five plants are either under construction or in the planning stage at a total cost of $40,000,000.

Container Corp. will build a paperboard mill in West Germany, probably south of Bremen. Planned for a daily production of 110 tons, the plant is expected to cost $4,700,000.

The firm also plans the construction of a $3,500,000 corrugated container fabricating plant on a site yet to be acquired about 15 miles southwest of Chicago. The operation will have an annual capacity of 500,000,000 sq. ft. of container products.

New plants already announced include a 300-ton bleached sulfate and board mill at Brewton, Ala.; a boxboard mill in Los Angeles, and a corrugated boxboard unit at Seattle.

In addition, Container Corp. expects before the end of the year to have acquired and merged Mengel Co. of Louisville — now 65 per cent controlled.

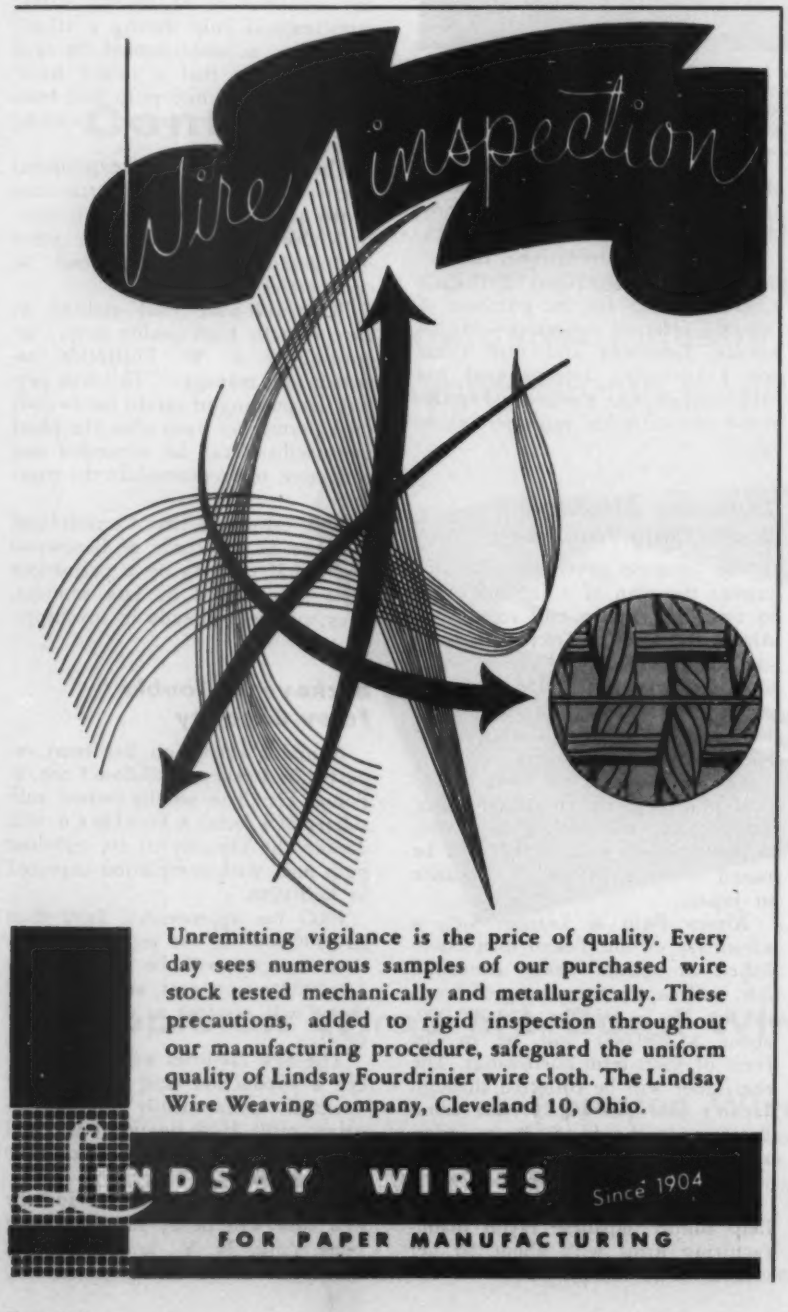
Program Announced for 1956 FPRS Meeting

The 10th national meeting of the Forest Products Research Society will be held June 4-7 at Asheville, N. C.

The technical program will include sessions on quality control, wood preservation, veneers and plywood, wood seasoning, hardboard and chipcore, wood finishing, containers and packaging, glues and gluing, marketing of wood products, machining of chipcore, chemical utilization and logging and milling.

Featured will be the FPRS Table-Top Exhibit, which will include representative displays of raw materials and equipment used in the production of wood products. Types of exhibits may include adhesives, finishing materials, woodworking machinery, photographic displays, trade publications, various university and research laboratory displays, finished wood products, etc.

Men associated with the pulp and paper industry who will take part in the FPRS sessions include: W. L. Meek of Minnesota & Ontario Paper Co., International Falls, Minn.; R. C.



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Sproull of the Herty Foundation, Savannah, Ga.; J. F. Saeman, J. F. Harris and E. G. Locke, all of the U. S. Forest Products Laboratory in Madison, Wis.; I. A. Pearl of the Institute of Paper Chemistry, Appleton, Wis.; R. H. Alexander of Howard Smith Paper Mills Ltd., Cornwall, Ont.; K. Trowbridge of North Carolina Pulp Co., Plymouth, N. C., and J. Hoffman of Kimberly-Clark Corp., Neenah, Wis.

Mill Tour to be Feature of 37th Superintendents Meeting

A visit to the plant of Newton Falls (N. Y.) Paper Mill Inc. will be a feature of the 37th annual convention of the American Pulp & Paper Mill Superintendents Association. The gathering will be at the Lake Placid Club in Essex County, N. Y., June 12-14.

The mill itinerary will include inspection of the water filtering system, the Alphocel process for developing stock, push-button stock blending controls, Syco mechanical paper machine drives, the beta-ray thickness gauge, microjet coating process and the gloss reading controls on the supercalenders. In addition, the visitors will see a modern deinking plant, a Hygrotester installation on a coating line, Bauer cleaners, Roto-belts, a modern coating plant, supercalenders, rewinders and some of the latest equipment for controlling pH, moisture content and sheet surface.

Great Lakes to Install Fourth Newsprint Unit

Installation of a fourth newsprint machine to come into operation in July 1958 at Fort William, Ont., has been announced by Great Lakes Paper Co. Ltd. It is reported that the new unit will be the largest newsprint machine in the world and will have an annual capacity of well over 100,000 tons. The 340-in. fourdrinier will be supplied by the Bagley-Sewall Div. of the Black-Clawson Co.

The machine is the first phase of an extensive new expansion program, for which the provincial government will provide raw material and hydro-electric power. The project will cost between $35,000,000 and $40,000,000 and is in addition to the current project that also involves the installation of a newsprint machine.

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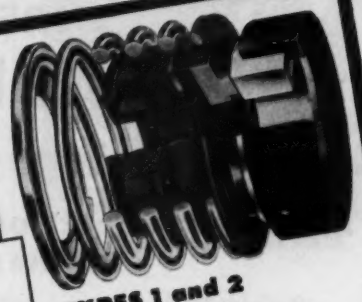

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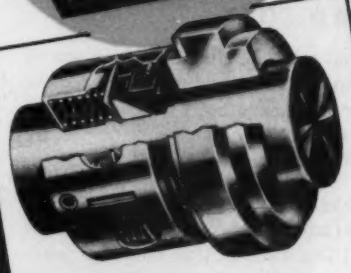

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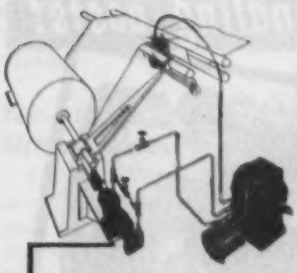


THREE from ONE

ASKANIA

Edge Position Control

INCREASED PRODUCTION • IMPROVED QUALITY
REDUCED COST

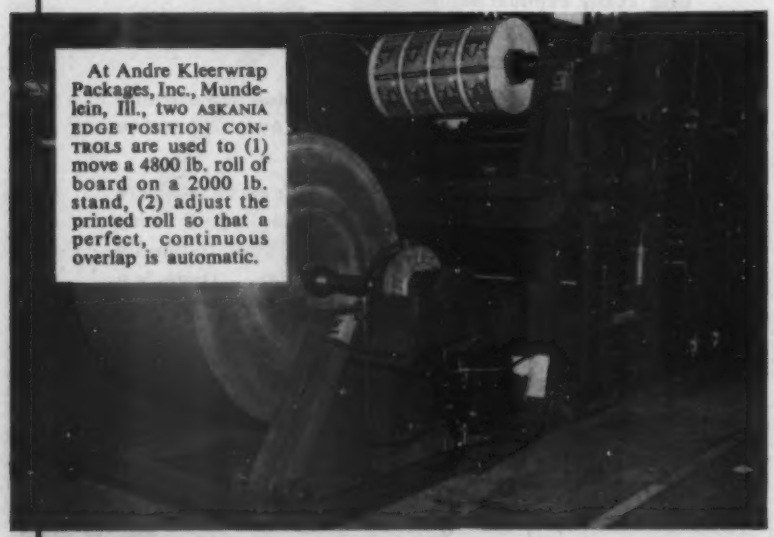
• You need only one easy-to-install-and-maintain addition to new or existing equipment—the ASKANIA EDGE POSITION CONTROL—to achieve automatic cutting, slitting, marking and laminating. Continuous, accurate line production . . . maximum speed . . . minimum downtime . . . are among the specific results obtained from its use.

ANY SIZE, SPEED OR MILL—The ASKANIA EDGE POSITION CONTROL can be applied to any size web running at any rate of speed in any mill. Your own mill mechanic can INSTALL IT! The speed of your own equipment is the only limit to the amount of run-out it can correct. The precision with which LAMINATING and other operations are regulated is a major production factor. Perfect alignment at high speed results.

HOW IT WORKS—This control has a sensing nozzle, a jet pipe regulator and a hydraulic work cylinder. (1) The sensing nozzle measures web error of less than .005 inch. (2) The jet pipe regulator converts the small air pressure measurement provided by the sensing nozzle into a high level hydraulic force. (3) The work cylinder applies that force to the web under control. No contact is made with the moving web.

CONTINUOUS CONTROL • HIGH SPEED OPERATION • NON-CONTACT HYDRAULIC OPERATION • MOST ACCURATE CONTROL • WIDE RANGE

Send for Bulletin No. 161 and 166 for complete information.
Write Askania Regulator Co., 294 East Ontario Street, Chicago, Illinois.



At Andre Kleerwrap Packages, Inc., Mundelein, Ill., two ASKANIA EDGE POSITION CONTROLS are used to (1) move a 4800 lb. roll of board on a 2000 lb. stand, (2) adjust the printed roll so that a perfect, continuous overlap is automatic.

ASKANIA REGULATOR COMPANY

"CONTROLS FOR INDUSTRY"

HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS, ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

A Subsidiary of General Precision Equipment Corporation

News of the Industry . . .

Other phases of the recently-announced expansion will embrace wood cellulose products in addition to newsprint and will be designed to utilize the widest possible variety of wood species.

U.S.-British Group Plans New Brunswick Mill Construction

Construction of a $50,000,000 pulp and paper mill at Lepreau, N. B., (23 miles from St. John) was expected to start in May. Backing the project is a syndicate of British and United States interests. The mill is to be built and operated by Maritime Pulp & Paper Mills Corp.

Speculation earlier this year was that Butler Co. of Chicago and McAlpines of London were investigating the possibility of establishing a pulp and paper plant in the Lepreau area. The firms had purchased the interests of Maritime Pulp & Paper, which was chartered in 1948.

The New Brunswick Electric Power Commission is negotiating to provide power for a 50,000-kw coal-fed thermal plant.

Lubrication of Dryer Roll Bearings Under Study at University of Maine

A broad study of the lubrication of dryer roll bearings used in pulp and paper mills is being carried out at the University of Maine in Orono for the Texas Co. The aim of the research—now in its fourth year—is to determine the role of the lubricant in bearing failure.

Standard lubricant research apparatus has been augmented by unique test equipment specially designed and constructed to facilitate physical, chemical and metallurgical determinations.

Failed bearings furnished by pulp and paper mills have been subjected to a number of tests in the Texaco-sponsored program to determine what factors contributed to their break-down. The samples are tested for hardness, purity of the metal, surface finish, surface defects and possible change in metallic structure as a result of use. The effect of such operating conditions as presence of moisture, temperature, speed are be-

LATEST TOWBOAT to join Powell River Co. Ltd.'s log pond flotilla is workmanlike, 45-ft. "Tex," a tug that can double as a fireboat. Built by John Manly Ltd. of New Westminister, B. C., the vessel is driven by a 225-hp Murphy diesel. For fire fighting, a 625-gpm centrifugal pump can hurl a stream of water for a distance of 300 ft. Among "Tex's" precautionary features are a steel bar cage for the propeller and magnesium anodes attached to the hull to minimize the effect of seawater and corrosion. A crew of four mans the vessel

ing studied. In addition, the study aims to determine how effectively new lubricants can be evaluated and how they can be used for greatest efficiency.

The program is being carried out through the university's Department of Industrial Cooperation. John B. Calkin, former director of the Department and now assistant to the president of Foster D. Snell Inc. and consultant to Texas Co., organized the study. Director of the project for the university is Prof. Harry B. Watson, head of the Department of Mechanical Engineering. Prof. Francis J. Sullivan is project supervisor.

Water Supply Plant Planned by Oxford Paper

Oxford Paper Co. will build in Rumford, Maine, a modern design chemical coagulation, filtration and clear water storage plant at a cost of about $2,000,000. The operation is being designed to deliver a daily 12,000,000 gal. of quality water for the manufacture of high-brightness papers.

The main building—a reinforced concrete and brick structure 220 ft. long and 110 ft. wide—will be erected on the east side of the penstocks that run between the Middle and Low canals. Facilities will include a pressure pumping system. The plant will supplement the existing filter plant located in the main mill building.

First Newsprint Ship of Season Reaches Chicago

The motor ship *Black River* was the first newsprint carrier to reach Chicago in the 1956 Great Lakes shipping season. Operated by *The Chicago Tribune*, the vessel carried a cargo of 3241 tons from the Thorold, Ont. mills of Ontario Paper Co. Ltd., a Tribune Co. subsidiary.

The Chicago newspaper's fleet of paper carriers consists of 11 ships, five steam-driven and six motor-driven. During 1955 the fleet carried 162,000 tons of newsprint to the Tribune from mills at Baie Comeau, Que., and Thorold. The vessels also delivered pulpwood to the mills from timber holdings at Heron Bay and Manitoulin Island, Ont., and Franquelin and Shelter Bay, Que.

Big Increase in Pulp Production Forecast

An official of Weyerhaeuser Timber Co. predicted recently in Everett, Wash., that North America's pulp production will be increased by more than 500,000 tons by the end of 1957.

L. K. Larson of New York, N. Y.,

CORPORATION BRIEFS

• Edited by GEORGE BLACK

COOPER ALLOY

VALVE CLINICS

In spite of our belief that the Cooper Alloy stainless steel valve offers the best in design and operating features, we take it to school regularly. This "school" consists of continual study by field engineers, design engineers and by industry itself subjecting it to intensive examination and reporting their findings at organized Valve Clinics.

Cooper Alloy Valve Clinics have been held in dozens of leading plants, including Dow, DuPont, Mathieson, Celanese, Pfizer and many others. Arrangements for such a clinic in your own plant may be made through our Public Relations Division.

"FLEX-ALLOY" STAINLESS PUMP

A new line of stainless steel rotory pumps for corrosive solutions, abrasive slurries and fluids which must be kept free from contamination has just been announced by our Vanton Pump & Equipment Division. Called "Flex-Alloy" these new pumps in type 304 or 316 stainless (other alloys on request) incorporate the same no-stuffing box, no-shaft seals, no-gasket features of the popular "flex-i-liner" plastic pump series. Full details are given in Bulletin VP561.

FAST AND COLD

On October 14, 1947, the Bell X-1 made history by flashing through the skies faster than sound. Cooper Alloy is proud to have been teamed with the Glasby Company in helping Bell Aircraft carve its notch in history by furnishing the 30" diameter, 3" wall stainless steel sphere required for handling the liquid nitrogen.

COOPER ALLOY
CORPORATION • HILLSIDE N J

Weyerhaeuser pulp sales manager, declared that pulp production will continue to boom for the next two decades and placed United States pulp requirements by 1975 at 60 per cent over present capacity.

British Columbia Output Hits All-Time Peak

Production of pulp and paper in British Columbia rose to a new high of 1,407,561 tons during 1955, according to a recent report of the Western Division of the Canadian Pulp & Paper Association.

The report notes the great progress that has been made recently in wood utilization through the use of small wood, salvage wood, salvage logs and mill residue recovery. It is estimated that the pulp and paper industry recovered 490,000,000 bd. ft. of wood that would have otherwise been wasted or put to poorer use. Seven years ago there were no facilities for the utilization of this material.

Newsprint comprised 41 per cent of the total output, and the production of other manufactured items — excluding newsprint — rose to 153,298 tons. The value of production also reached a new high of $205,407,868.

Rainmakers Employed by Crown Zellerbach

Artificial rainmaking is the latest of the extraordinary efforts recently employed by Crown Zellerbach Corp. and its Canadian subsidiaries to combat the unfavorable weather conditions that have severely reduced the production of newsprint.

Crown Zellerbach Canada Ltd. has retained a commercial rainmaking firm to "induce" precipitation for the Ocean Falls, B. C. mill, where a record dry winter has lowered the level of Link Lake and reduced the mill's hydro-electric power. As a consequence, the two newsprint machines have been cut from a seven- to a five-day operation.

The rainmakers, North American Water Consultants of Santa Barbara, Cal., will seed cloud formations from eight ground generating units whenever atmospheric conditions appear "ripe" for artificially-produced rain.

The rainmaking venture follows extensive efforts by Crown Zellerbach to combat just the reverse in weather conditions — excessive rainfall at its West Linn, Ore. paper mill. There, late December storms sent the Willamette River to its highest flood level in 22 years. "We need rain in British Columbia and sunshine in Oregon," said G. E. Young, CZ vice president for newsprint and printing paper sales, "and we're hoping the rainmakers can help steer nature back to its regular course."

Abitibi to Boost Newsprint Production in $22,000,000 Project

A $22,000,000 expansion program at the Fort William, Ont. mill has been reported by Abitibi Power & Paper Co. Ltd. The project will increase the plant's newsprint capacity to more than 150,000 tons annually by 1958. Present output is about 65,000 tons.

A 276-in. Beloit high-speed unit, which will operate initially at 2000 fpm, is to be designed for a maximum of 3000 fpm. The new unit will begin operation at a 300-ton per day rate.

The expansion will also increase the mill's wood-handling facilities.

Eight additional wood grinders and expanded screening facilities will be required to supply the groundwood pulp. There will also be an increase in

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Kalamazoo TANK and SILO CO.

TILE TANK DIVISION
527 Harrison Street
Kalamazoo, Michigan

the capacity of high-yield sulfite, refining and screening systems.

"Ham Feltz" Throws Hat in Ring

"Ham Feltz," the trademarked character who represents Shuler & Benninghofen to the felt-buying public, needs a new summer hat. And S&B is offering a brand new Stetson to anyone who can come up with an acceptable suggestion.

The new chapeau will replace the paper hat that "Ham" has worn for several years. With changes in men's fashions over the years, the personification of Hamilton Felts has had his headgear changed several times, and it is believed that the time is ripe to change again. It is not necessary that the contestant be an artist; a rough sketch or a paper folded to the suggested shape will suffice. All entries should be sent to "Ham Feltz" in care of Shuler & Benninghofen at Hamilton, Ohio.

Titanium Pigment Plant Under Construction In Canada

Construction of Canada's first titanium pigment plant has been started at Varennes, Que., by Canadian Titanium Pigments Ltd., a subsidiary of National Lead Co. The entire output of the $15,000,000 plant will go to Canadian industry.

The plant, which is located on a 76-acre tract in an industrial area on the St. Lawrence River about 15 miles northeast of Montreal, is expected to be in production next year, employing about 300 people. The specialized chemical processing equipment to extract titanium from the ore will be housed in buildings enclosing nearly 90,000 sq. ft.

Allied News Briefs . . .

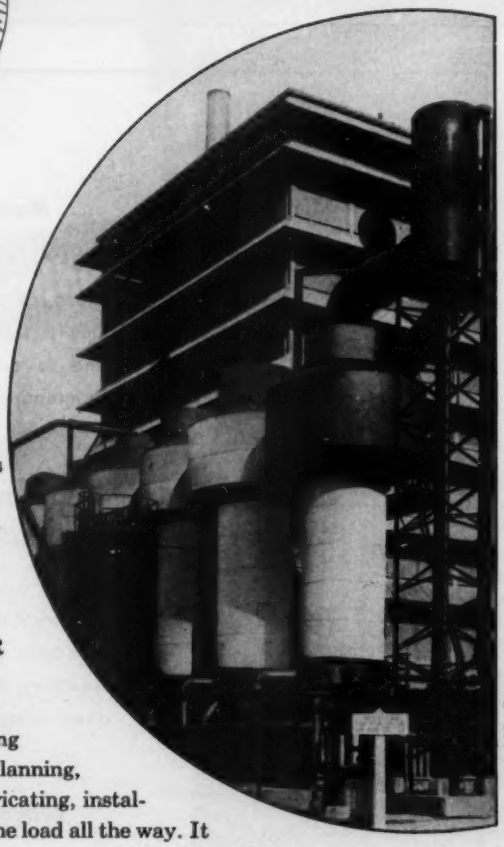
Borden Co.'s Chemical Div. will build a formaldehyde and synthetic resin plant at Fayetteville, N. C. Scheduled for completion late this year, the operation will produce an annual 36,000,000 lb. of formaldehyde.

Hyster Co. will erect a $150,000 factory addition in Peoria, Ill., for expansion of its facilities there. Construction will start in June and com-

We'll shoulder the entire load . . .

from design

. . . to finished product!



Goslin-Birmingham's complete, integrated organization is always at your disposal. Our process engineers are available for prompt, on-the-spot technical consultation and planning. G-B takes YOUR processing problem and comes up with the solution . . . from planning board to installation. Planning, designing, casting, fabricating, installing . . . G-B shoulders the load all the way. It will pay to solve your processing problems the G-B way.

The illustration shows a Goslin-Birmingham six-body sextuple effect evaporator of advanced design at the Halifax Paper Co., Roanoke Rapids, N.C.

GB

G-B Engineers are at your service any time to discuss your processing problems . . . without cost or obligation.

GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM • ALABAMA

pletion is scheduled for November of this year.

Plans for merging **Reichhold Chemical Inc.** into **Catalin Corp. of America** have been announced, subject to the approval of the stockholders of both corporations. The new corporation will be called Reichhold Catalin Industries Inc.

Paisley Products Inc., New York and Chicago, has acquired **Woerz Paste & Gum Co.** of Los Angeles. Ralph Woerz, former owner, will continue as general manager of the Los Angeles Div. and will direct the planned expansion program.

News of the Industry . . .

A new organic chemicals section to promote the sales of chlorinated methane and chlorinated benzene products will be established by the Solvey Process Div. of **Allied Chemical & Dye Corp.** This is the latest expansion of Solvay's sales program outside the basic alkali field.

West End Chemical Co., West-end, Cal., announces that expansion of its sodium sulfate and salt cake facilities will double the present 50,000-ton capacity for these products by the end of this year.

John W. Bolton & Sons Inc. has announced the formation of three sales regions designed to promote improvements in service and deliveries to pulp and paper mills. Areas affected are the South, Midwest, Pacific Northwest. Manager of the southern region is Samuel E. Crocker, whose territory will extend from the Atlantic to the Mississippi Valley and northward through the Carolinas and Tennessee. Joseph M. Steiner has been assigned to the Midwestern region, while O. E. Larson is manager of the western region, covering mills west of the Rockies.

A. E. Staley Mfg. Co. has expanded its research facilities and appointed a new vice president to head the division. Dr. Thomas L. rector of organic chemicals and engineering research for B. F. Goodrich Co., has been named vice president in charge of research and Gresham, who is resigning as di-development.

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. . . to reduce excess "down-time". To reduce "Costs" and to establish "Par" in maintenance performance.

Experienced Time Study "Standards"

. . . to establish degree of efficiency and to raise performance of Converting, Finishing, Shipping and all direct labor operations.

Wage Incentives

. . . with emphasis on quality, both hourly and supervisory, for Pulp, Papermaking, Finishing and Converting operations.

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Coming Events

Tappi

May 17—Kalamazoo Valley (joint meeting with Michigan Superintendents), Hotel Harris, Kalamazoo

May 17—Pacific (joint meeting with Pacific Coast Superintendents), Gearhart Hotel, Gearhart, Ore.

May 18-19—Southeastern, King & Prince Hotel, Brunswick, Ga.

July 9-20—Fifth Statistical Conference (co-sponsored with CPPA Technical Section), Queens University, Kingston, Ont.

American Pulp & Paper Mill Superintendents Association

May 17—Michigan (joint meeting with Kalamazoo Valley Tappi), Hotel Harris, Kalamazoo

May 17—Northwestern, Rhinelander Wis.

May 17-19—Pacific Coast (joint meeting with Pacific Tappi), Gearhart Hotel, Gearhart, Ore.

May 18—Connecticut Valley, Roger Smith Hotel, Holyoke, Mass.

June 12-14—National Meeting, Lake Placid Club, Lake Placid, N. Y.

Other meetings

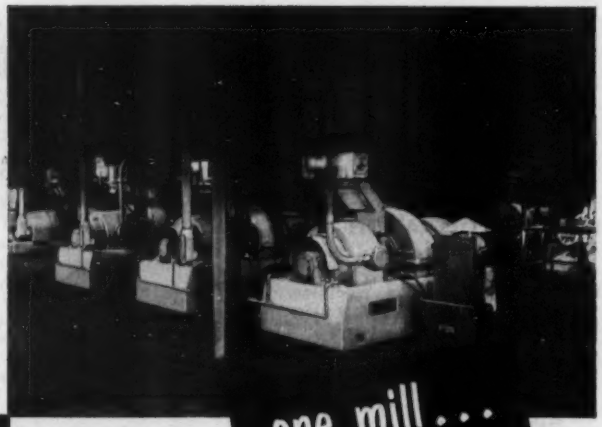
June 4-7—Forest Products Research Society, 10th national meeting, Asheville, N. C.

June 5-7—Paper & Twine Association, annual meeting, Nippersink Manor, Genoa City, Wis.

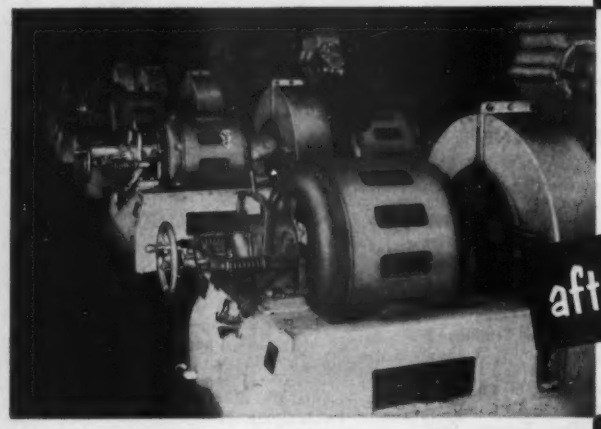
June 13-15—CPPA Technical Section, summer meeting, Manor Richelieu, Murray Bay, Que.

July 9-20—Fifth CPPA Statistical Conference (co-sponsored with Tappi), Queens University, Kingston, Ont.

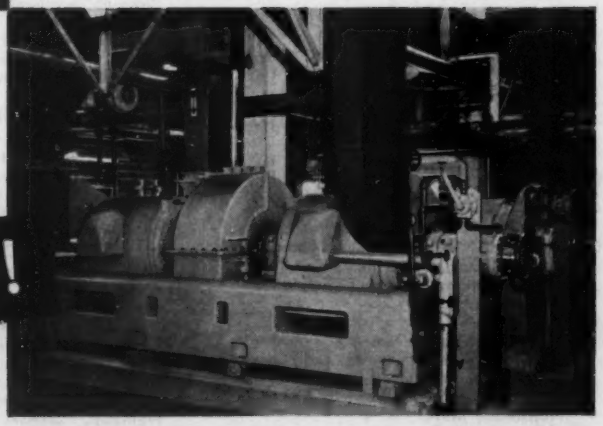
The Rapid Trend Toward
Bauer Double-Disc Refiners for Semi-Chemical Pulp



one mill . . .



after another . . .



after another!

To get the best job of fiberization, high speed is right. And a Bauer Double Revolving Disc Refiner has it—2400 differential rpm between the rotating heads. Bauer double-disc refiners have no stationary plate to cut fibers. A Bauer will produce high quality semi-chemical pulp with less chop, better testing qualities, and better formation on the machine.

We're not prejudiced toward double-disc either, because we make the best and most modern pressure and free discharge single-disc mills offered to the industry.

Write, wire, or phone us for more detailed information on Bauer Refiners.

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37th Annual Convention

THE AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION

June 12-14, 1956

Lake Placid Club, Essex County, N. Y.

GROUP MEETINGS PROGRAM (TENTATIVE)

Wednesday, JUNE 13th—2:30 P.M.

PULP MILL OPERATION

CHAIRMAN—C. E. Hartford, Riegel Paper Corporation, Acme, N. C.

CO-CHAIRMAN—Vernon Woodside, Olin Mathieson Chemical Corporation, New Orleans, La.

Neutral Sulphite Semi-Chemical Pulping II—Chemical Effect in the Pulping of Red Maple and Brazilian Eucalyptus—W. J. Nolan, University of Florida, Gainesville, Fla.

Ammonia Base Pulping—Marcel Barsalou, Fraser Paper Ltd., Edmundston, N. B., Canada

Production of Chlorine Dioxide at New High Efficiencies—W. W. Northgraves, Olin Mathieson Chemical Corporation, Baltimore, Md.

COATED PAPERS AND BOARD

CHAIRMAN—Joseph Loomer, The Robert Gair Company, New London, Conn.

CO-CHAIRMAN—Olin W. Callighan, Minerals & Chemicals Corporation of America, Kalamazoo, Mich.

Survey of Machine Coating Methods—G. L. Booth, The Black-Clawson Company, Dilts Machine Works Div., Fulton, N. Y.

Further Electron Microscope Studies of Coating Surface Structure by the Pre-Shadowed Replica Technique—Joseph Comer, Penn State University, University Park, Pa.; and S. C. Lyons, Georgia Kaolin Company, Dry Branch, Ga.

High Speed Cinematographic Study of Ink Distribution and Transfer—L. S. Engle, J. W. Howard, W. Jones and D. Smith, Interchemical Corporation, New York, N. Y.

POWER

CHAIRMAN—Albert S. Goodrich, Hammermill Paper Company, Erie, Pa.

CO-CHAIRMAN—Walter C. Bloomquist, General Electric Company, Philadelphia.

General Features of Power Supply and Requirements for Typical Pulp and Paper Mills—A. Kirkpatrick, Chas. T. Main, Inc., Boston, Mass.

Power for Paper Machines and Other Paper Mill Equipment: How Applied and Supplied—Roland A. Packard, Hopkinton, Mass.

The Paper Mill Superintendent and His Air-Handling System—Paul Goldner, J. O. Ross Engineering Corporation, New York, N. Y.

Water Supply for Pulp and Paper Mills—K. H. Fleming, Hammermill Paper Company, Erie, Pa.

INDUSTRIAL RELATIONS

CHAIRMAN—William McFeeley, Riegel Paper Corporation, New York, N. Y.

CO-CHAIRMAN—Howard E. Wehr, The Mead Corporation, Harriman, Tenn.

A Panel Discussion of Industrial Relations Problems: Panel Members: William McFeeley, Riegel Paper Corporation, New York, N. Y.; G. W. Vaughan, Union Bag & Paper Corporation, New York, N. Y.; J. W. Towsen, West Virginia Pulp & Paper Company, New York, N. Y.

Each member will give a short paper. The papers will be followed with audience participation.

Thursday, JUNE 14th—9:00 A.M.

FINE PAPER AND TISSUE

CHAIRMAN—C. M. Connor, W. C. Hamilton & Sons, Miquon, Pa.

CO-CHAIRMAN—J. P. Strasser, Morningstar, Nicol, Inc., New York, N. Y.

Size Press Pigmenting—C. M. Sigvardt, Nekoosa-Edwards Paper Company, Port Edwards, Wis.

Opacity and Filler Retention—R. Tourangeau, E. B. Eddy, Ltd., Hull, Quebec, Canada

Report of Dryer Felt Committee—William K. Metcalfe, J. O. Ross Engineering Corporation, New York, N. Y.

Advances in Manufacturing of Dryer Felts—Edward Race, Scapa Dryers Ltd., Blackburn, Lancs., England

CYLINDER BOARD MACHINE OPERATION

CHAIRMAN—C. Ives Gehring, Oswego Falls Corporation, Fulton, N. Y.

CO-CHAIRMAN—J. E. Hartford, The Black-Clawson Company, Shartle Brothers Division, Middletown, Ohio

Operation of Canadian Board Machine and Description of 100-in. Six-Cylinder Machine with Vacuum Top Liner Vat—C. S. V. Hawkings, Price Brothers & Company, Ltd., Kenogami, Quebec, Canada

Utilization of Waste Paper in Manufacture of Cylinder Folding Grades—George Oechsle, The Robert Gair Company, Piermont, N. Y.

Cylinder Food Boards from Southern Pines—Edgar Turnbull, The Champion Paper & Fibre Co., Hamilton, Ohio.

KRAFT BOARD FOURDRINIER

CHAIRMAN—Thomas Coldewey, St. Joe Paper Company, Port St. Joe, Fla.

CO-CHAIRMAN—James E. Smith, Albany Felt Company, Albany, N. Y.

Growing Pains with Suction Couch Rolls—J. S. Majors, West Virginia Pulp and Paper Company, Charleston, S. C.

Fourdrinier Wet End Operations with Pick-Up Felt—S. K. Pratt, St. Regis Paper Company, Jacksonville, Fla.

Recent Developments on High-Speed Fourdrinier Machines— W. C. Corbin, The Black-Clawson Company, Paper Machine Division, Watertown, N. Y.

Panel Discussion of Above Paper—W. F. Hathaway, Moderator, KVP Company, Kalamazoo, Mich.; and F. X. Krailing, Thilmany Pulp & Paper Company, Kaukauna, Wis.

WOODS AND WOOD ROOM OPERATIONS

CHAIRMAN-C. J. Maki, Bowaters Southern Paper Corporation, Calhoun, Tenn.

CO-CHAIRMAN—Carl Newell, Simonds Saw and Steel Company, Fitchburg, Mass.

Problems of Pulpwood Production—T. Busch, International Paper Company, Mobile, Ala.

Barking of Hardwoods and Pine—Ralph Hooks, West Virginia Pulp and Paper Company, Covington, Va.

Handling and Splitting of Oversize Logs—A. R. MacBeth, Riegel Paper Corporation, Acme, N. C.

2:30 P.M.

MILL MAINTENANCE

CHAIRMAN—R. G. Macdonald, Ecusta Paper Corporation, Pisgah Forest, N. C.

CO-CHAIRMAN—William Monks, E. D. Jones & Sons Company, Pittsfield, Mass.

Preventive Painting Maintenance—N. A. Mason, Pittsburgh Plate Glass Company, Pittsburgh, Pa.

Maintenance Organization and the Consultant—Harold Ingraham, Chas. T. Main, Inc., Boston, Mass.

Do You Know What Your Maintenance Costs Are?—Edward Conley, The Champion Paper & Fibre Company, Canton, N. C.

MATERIALS HANDLING

CHAIRMAN—Stanley H. Tippett, Container Corporation of America, Philadelphia.

CO-CHAIRMAN—J. A. Paciello, E. I. du Pont de Nemours & Co., Philadelphia.

Materials Handling—R. G. Hagermann, Container Corporation of America, Chicago, Ill.

Traffic Management—Stanley H. Tippett; Container Corporation of America, Philadelphia, Pa.

Materials Handling Equipment—Edward Doonan, St. Regis Paper Company, New York, N. Y.

Plant Layout—H. F. Bonney, Benj. C. Betner Division, Continental Can Company, Devon, Pa.

CYLINDER BOARD MACHINE OPERATION

CHAIRMAN—C. Ives Gehring, Oswego Falls Corporation, Fulton, N. Y.

CO-CHAIRMAN—D. H. Schamp, Beloit Iron Works, Beloit, Wis.

The Old Order Changeth—D. B. Geffken, Oswego Falls Corp., Fulton, N. Y.

Crossett's New 216-in. Bleached Kraft Board Machine—James C. Hair, Crossett Paper Mills, Crossett, Ark.

Discussion of above papers—Panel Members—C. Ives Gehring, J. E. Hartford, D. H. Schamp, C. S. V. Hawkings, George Oechsle, Edgar Turnbull, D. B. Geffken, James C. Hair.

TECHNICAL CONTROL

CHAIRMAN—Rudolph T. Greep, S. D. Warren Co., Cumberland Mills, Me.

CO-CHAIRMAN—Walter Morehouse, Nopco Chemical Co., Harrison, N. J.

Effective Control and Its Organization—Erving W. Rasmussen, Scott Paper Company, Chester, Pa.

Sheet Moisture Control on the Paper Machine—John F. Langmaid, Jr., S. D. Warren Co., Cumberland Mills, Me.

Headline speakers at general sessions or other functions include W. G. Ward, General Electric Company, Schenectady, N. Y.; Dr. James E. Allen, Jr., President, University of the State of New York; Jack Lavelle of the New York Giants; and Gene Flack, Counsel and Director of Advertising, Sunshine Biscuits, Inc., New York, N. Y.

The program also includes a plant visit to the mill of Newton Falls Paper Mill, Inc., Newton Falls, N. Y.

A Convention with the know-how for those who want to know.

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NAMES in the NEWS

G. A. Day

P. M. Goodloe

Dr. H. E. Mahncke

F. C. Hawks Jr.

D. H. McMurtrie

B. G. Hoos

Brown Promotes G. A. Day

Dr. George A. Day, since 1944 director of research, has been named technical director of Brown Co., Berlin, N. H. He will be in charge of all technical affairs, including direction of new developments and the guidance of the Research and Quality and Process Control departments.

Also announced were three other Brown appointments: Dr. Paul M. Goodloe, director of quality and process control, will in addition serve as assistant technical director; Douglas H. McMurtrie, who has been research associate in pulp, becomes director of research, and B. G. Hoos, who has been assistant to McMurtrie, is promoted to research associate in pulp.

Rayonier Appointments

Rayonier Inc. has recently named Dr. Henry E. Mahncke assistant manager of the firm's new Eastern Research Division at Whippany, N. J., where he is currently recruiting scientific personnel. Dr. Mahncke was formerly manager of the physical chemistry section at Westinghouse Research in Pittsburgh.

In other Rayonier appointments, Frank C. Hawks Jr. was named assistant resident manager of the Shelton (Wash.) Div., and J. G. E. Ellis has been transferred on a temporary assignment to Vancouver, B. C. Since 1955, Hawks, who joined the firm in 1939, has been on the Shelton maintenance and engineering staff. Ellis, whose regular post is that of assistant chief engineer at the Central Engineering Div. in Hoquiam, Wash., will work on the $11,000,000 expansion and modernization program at Rayonier's subsidiary, Alaska Pine & Cellulose Ltd.

T. J. Burke

C. H. Leach

Association Changes

Thomas J. Burke has retired as secretary-treasurer of both the Sulphite Paper Manufacturers Association Inc. and the Glassine and Greaseproof Manufacturers Association. He will continue as secretary-treasurer of the Vegetable Parchment Manufacturers Association. He is to be succeeded in the former posts by Charles H. Leach. Burke had devoted 35 years to pulp and paper industry association work, having been appointed to the staff of the Cost Association of the Paper Industry in 1920.

Leach joined the associations in 1953 and since that time has been assistant secretary-treasurer.

In other association changes, Philip O. Deitsch has resigned as administrative officer for the Waterproof Paper Manufacturers Association. He joined the organization 15 years ago. And G. D. Cook has retired as secretary of the Specialty Paper and Board Affiliates, to which he came after a long career in the U. S. Forest Service. He is succeeded by George J. Johnson, most recently secretary of the Industrial Relations Committee of the American Paper and Pulp Association.

N.G. Names Buchanan

Fred L. Buchanan has been named to operate National Gypsum Co.'s new paperboard mill at Anniston, Ala. Employed by the firm since 1950, Mr. Buchanan was most recently manager of the Pryor, Okla. plant.

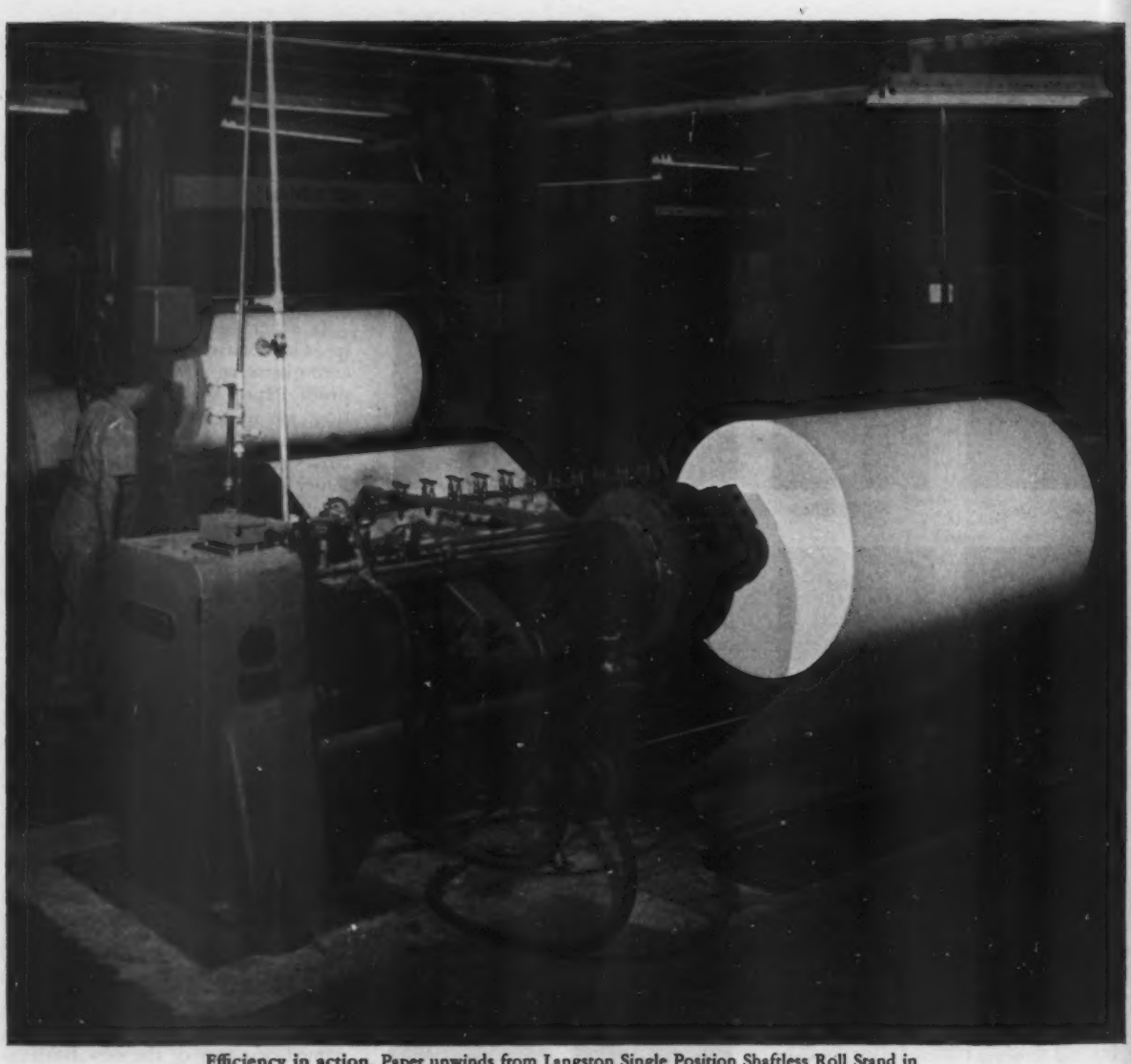
Succeeding him at Pryor is Arthur H. Costain, formerly manager at Newburgh, N. Y., where he in turn is being succeeded by William H. Morea, until now assistant plant manager at Kalamazoo, Mich.

In another National Gypsum appointment, Holger Petersen has been named manager of the new Burlington, N. J. gypsum plant. Petersen was associated with Atlantic Gypsum Co. until its purchase by National Gypsum in 1936. He was formerly manager at the NG Baltimore operations, where he is being succeeded by Harold E. Beard.

J. Gordon Chalmers has retired as administrative vice president of Bathurst Power & Paper Co. Ltd. at Bathurst, N. B. He has been associated with the firm 42 years.

John J. Inch, veteran traffic consultant at Scott Paper Co. and since 1952 traffic assistant to the vice president in charge of distribution, has retired after 47 years of service.

R. C. Olson, formerly process engineering section leader, has been promoted to assistant manager of



Efficiency in action. Paper unwinds from Langston Single Position Shaftless Roll Stand in foreground; passes under stand; is slit and rewound on Langston Slitter & Winder Type "BA."

Langston Winder & Shaftless Stand

save paper cup company $9000 a year

To make paper cups and lids, Dixie Cup Co. starts with an efficient combination of Langston machines.

Paper stock in rolls 72 in. wide and weighing upwards of 2 tons are picked up from the floor conveyor by the Langston Type "BA" Shaftless Roll Stand and fed into the winder. This completely power-operated stand, equipped with constant tension brakes, is operated by one man. It ends forever the time and drudgery of old-fashioned roll shafting and the need for an overhead crane. Savings add up to $9000 annually.

The Langston Type "BA" Slitter & Winder runs at a speed of 1750 feet per minute—500 fpm faster than the former installation. Shear-cut Langston slitters make such clean edges that later trimming is eliminated. This feature, plus the automatic tension control provided by the Langston Roll Stand, has helped cut paper waste at Dixie Cup by 50%. Clean cutting also keeps the plant cleaner by holding paper dust to a minimum.

Langston Slitters & Winders are available in sizes up to 196 in. wide and in speed ratings to 3500 fpm and beyond. Shaftless roll stands can be ordered to match. If you aren't enjoying the greater efficiency these machines make possible, write for full details. SAMUEL M. LANGSTON CO., 6th & Jefferson Sts., Camden 4, N.J.

LANGSTON leadership...by design

Names in the News . . .

engineering development activities for Wood Conversion Co. in Cloquet, Minn.

Dr. Kenneth Lyle Pinder, formerly a chemical engineer with Shell Oil, has joined the staff of the Pulp and Paper Research Institute of Canada. He will work on the development of the atomized suspension technique for sulfite waste liquor recovery and other applications.

Dr. K. L. Pinder

Lowell Besley

Lowell Besley, formerly dean of the faculty of forestry at the University of British Columbia and since 1953 executive director of the American Forestry Association, has been named chairman of the woodlands research department of the Pulp and Paper Research Institute of Canada.

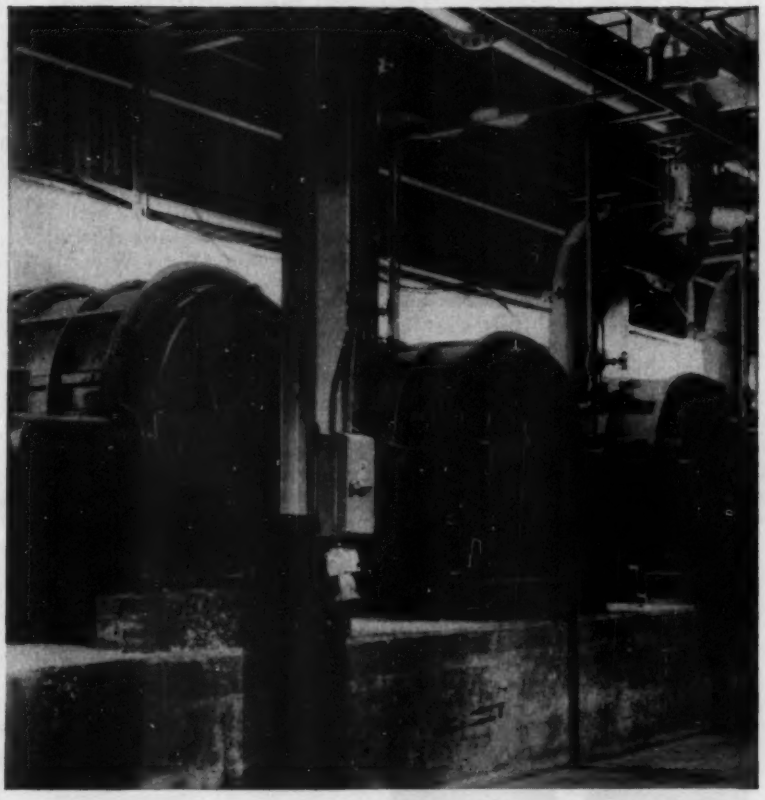
John D. Donaldson has been appointed general manager of Hearst Corp.'s Halifax Power & Pulp Co. at Sheet Harbour, N.S., succeeding the late E. Douglas Hyndman.

Alexander R. Andrew has been appointed assistant superintendent of the paper sensitizing division of Eastman Kodak Co. He recently returned from Kodak Brasiliera Ltd. in Brazil, where he was engaged in technical photographic work.

Dr. Fritz E. Brauns, research associate at the Institute of Paper Chemistry in Appleton, Wis., for 20 years, has recently retired. Dr. Brauns was a faculty member of McGill University at Montreal before joining the Institute staff.

Horace F. Winchell, division manager in staff engineering of Scott Paper Co., Chester, Pa., has been named plant manager of a Canadian company affiliated with Scott, Westminster Paper Co. Ltd. of New Westminster, B.C.

What, actually, do Vacuum Pumps on paper machines handle?



Paper mill engineers know that it is actually a mixture of air and water vapor, but the custom of rating vacuum pumps in terms of air capacity alone causes this important fact to be frequently overlooked.

The presence of this water vapor causes a considerable reduction of the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump the bulk of this water vapor is effectively condensed, due to the Nash operating principle. The air handling capacity of the Nash is therefore not reduced.

That is one of the reasons why Nash Vacuum Pumps are standard in over a thousand leading Paper Mills.

NASH ENGINEERING COMPANY

443 WILSON ROAD, SO. NORWALK, CONN.

Names in the News . . .

John W. Daniels has been promoted to superintendent of the Connecticut Corrugated Box Div. of Robert Gair Co. Inc. at Portland, Conn. He was formerly assistant superintendent under Joseph T. Murphy, who was recently appointed special production representative of Gair's Container Div.

J. W. Daniels

T. N. Bland

T. N. Bland, president of Fibreboard Products Inc., San Francisco, was reelected president of the National Paperboard Association at its annual meeting in New York. In 1954 Mr. Bland became the first West Coast member to serve in that capacity.

Paul Wilkenson, paper mill superintendent of the Williamsburg, Pa. mill of West Virginia Pulp & Paper Co., has retired after over 46 years with the company.

Paul Wilkinson

G. L. Nordstrom

Gustav L. Nordstrom was recently appointed executive director of the National Paper Box Manufacturers Association, succeeding A. E. Murphy, who has retired.

C. G. Russell Johnson has been elected a vice president of Kimberly-Clark Corp., and **F. H. Werling** and **Gordon G. Cosens** were named assistant vice presidents. The three will continue in their capacities of chief engineer, manager of mills and general manager of woodlands.

Allied Personalities . . .

Joseph J. Sweeney, formerly sales manager of Skil Corp.'s wholesale division, has been appointed director of marketing for the industrial and hardware divisions of Atkins Saw Div., Borg-Warner Corp. He will supervise all marketing and merchandising activities.

Norman G. Kappler has joined Lummus Co., New York, as pulp and paper consultant. He has been active in the pulp and paper industry for over 30 years.

Whiting Corp., Harvey, Ill., has announced the appointment of **William G. Dedert** as manager of the Swenson Pulp & Paper Div.

Floyd L. Coons has been named the mid-Atlantic sales representative of Appleton (Wis.) Woolen Mills.

Thomas A. Bruce is the new assistant bulk sales manager of Corn Products Refining Co. He will move to New York from San Francisco where he has been in charge of technical sales service work in the western division.

Richard A. Hatch, has been appointed west coast representative in the sale of pulp and papermaking machinery designed and built by Sandy Hill Iron & Brass Works. He was formerly with Central Distributor of Portland as a salesman specializing in closed-circuit industrial TV.

Harry R. Armstrong, former service manager of Cameron Machine Co., Brooklyn, N.Y., is now sales office manager of that company.

Robert D. Norton has joined Dean Bros. Pumps Inc. as New York manager of industrial sales.

Albert E. Forster has been elected chairman of the board of directors of Hercules Powder Co., succeeding **Anson B. Nixon,** who has retired. Forster was also re-elected president of the company. Nixon will remain as a member of the board. All other officers of the company were re-elected.

Herman E. Happel has been made director of research and development, in charge of engineering research, product design and development at Atkins Saw Div., Borg-Warner Corp., Indianapolis.

E. Rabun Swint has been named to the newly created position of manager, executive development, for the dyestuff and chemical division of General Aniline & Film Corp. He was formerly a director of education and assistant to the vice president, industrial relations.

James H. Sutherland, formerly Chicago district sales manager of SKF Industries Inc., has been named midwestern regional sales manager succeeding **Philip A. Carlson,** who has retired.

W. T. Butler has joined Bauer Bros. Co., Springfield, Ohio, as vice president and general manager of the company's plant in Brantford, Ont. He was formerly with Abitibi Power & Paper Co. as administrative assistant to the director of research.

H. R. Caldwell has been appointed manager of the New York district office of Whiting Corp. and will be in charge of the company's engineered products in eastern New York, northern New Jersey and all of New England.

J. H. Snyder, formerly mill manager for St. Regis Paper Co., Bucksport, Maine, has joined the nitrogen division of Allied Chemical & Dye Corp. He will be a sales development representative in promoting the use of the division's products in the paper industry.

William E. Finney, former sales engineer, Read Standard Corp., York, Pa., has been named to the newly created post of Cleveland district manager. He will handle both engineering and sales responsibilities for the company's blower-stoker division in Ohio, eastern Michigan and eastern Indiana.

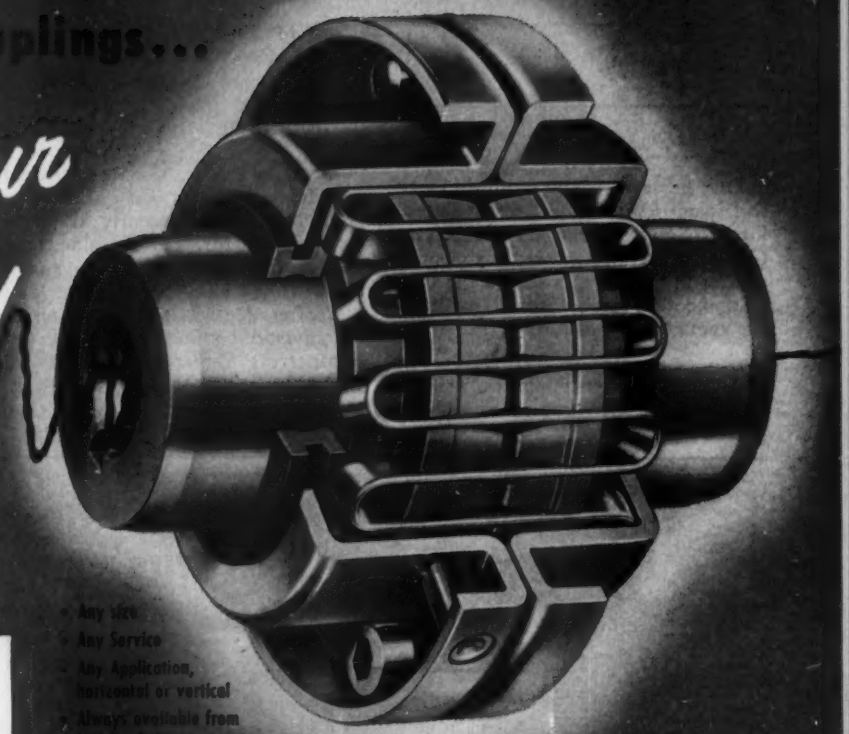
The Lockport Felt Co. has established an augmented sales program for the southern United States area, coinciding with the opening of the company's new mill at Starkville, Miss. **George W. Hardaker,** longtime southern representative, has been appointed sales and service manager of the southern division.

Horace B. Horton has been elected chairman of the board of Chicago Iron & Bridge Co. He joined the company in 1907 and has been its president since 1945.

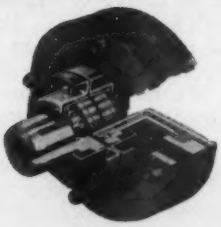
New sales engineers in Reliance Electric & Engineering Co. are: **T. R. Mahoney** at the Newark, N. J. office; **F. G. Griswold** at Cincinnati; **L. L. Seward** at Baltimore, and **J. R. Perample** at Detroit.

Falk Steelflex Couplings...

Protect your machinery in 2 ways



- Any size
- Any Service
- Any Application, horizontal or vertical
- Always available from factory, field or distributor stocks

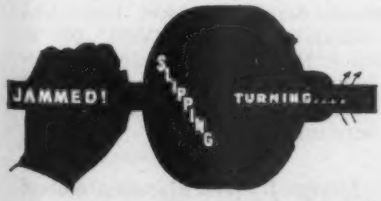


Falk Controlled Torque Couplings prevent damage from overloads

In applications where danger from overloads exists, use the FALK Type FT Controlled Torque Coupling. The Type FT has all the features and advantages of standard FALK Steelflex couplings—and, in addition, has an adjustable friction slip clutch, enabling the operator to set the coupling to slip at any predetermined overload.

This controlled-torque principle not only prevents transmission of dangerous shocks and limits overloads; it eliminates the breaking of shafts caused by jamming of driven equipment.

An outstanding advantage of the Type FT Coupling is that, as soon as the cause of the overload is removed, the entire coupling will rotate and transmit power without replacing parts or repairing coupling.



There's real economy in using Type FT Controlled Torque Couplings. Many users have reported that these couplings paid for themselves the very first time they slipped (under overload) because of the protection against damaged driving or driven machinery!

...cost less per year of service!

You get *double protection* when you connect your driving and driven machinery with a Falk Steelflex Coupling—the all-steel coupling with the exclusive grid-groove design! First, its *torsional resilience* smothers shock and vibration; and second, the Steelflex design prevents damage and lowered efficiency by accommodating shaft misalignment.

Why have increasing numbers of key men in industry standardized on Falk Steelflex Couplings? Their experience has proved that Falk Steelflex Couplings prolong the service life of their machinery... are trouble-free and need minimum maintenance... are easy to install, lubricate and disconnect... and *cost less per year of service* than ordinary couplings.

One basic Steelflex design—the type F, in its many sizes—is adaptable to more than 90% of all industrial applications. For applications involving danger from overloads, Modified Type FT Controlled Torque couplings (see column at left) are ideally suited. There are numerous other special or dual purpose Steelflex couplings for unusual applications. **Write to Department 247** for engineering bulletin, including selection and dimension tables.

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

FALK

...a good name in industry

MANUFACTURERS OF:

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

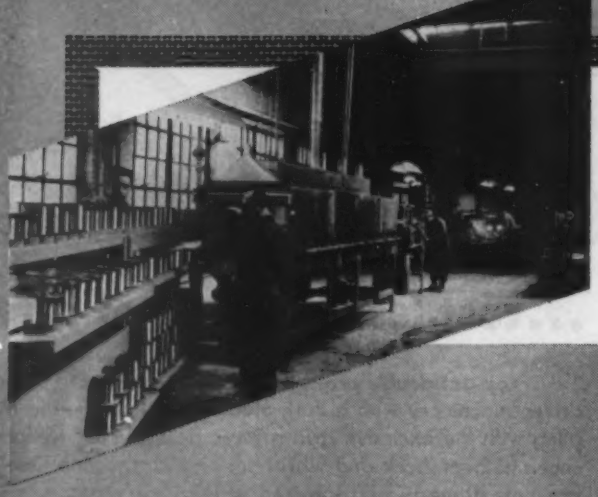
Necrology . . .

Dr. Edward A. Colman, 45, a soil scientist with the United States Forest Service, died in Berkeley, Cal., late in March. His extensive studies in soil physics led to the development of an improved method for measuring moisture in the soil.

Arthur Lawrence Jones, since 1920 secretary-treasurer of Armstrong Machine Works, died recently in Three Rivers, Mich. Born in 1886, Mr. Jones had been associated with Sheffield Car Co. prior to joining the Armstrong staff.

James A. LeRoy, 53, vice president of McLaurin-Jones Co. in Brookfield, Mass., died recently at Coral Gables, Fla. Mr. LeRoy joined the firm in 1934 as a purchasing agent, being named vice president not long thereafter. He was also chairman of the advisory committee of the Paper Engineering Department of Lowell Technological Institute in Lowell, Mass.

"From ingot to fourdrinier wire"



Just as one alloy differs from another, so do their individual requirements for annealling vary. A definite ratio of speed and temperature must be used for each type. Skilled employees, tending our modern annealling furnaces, adhere faithfully to the proper speed-heat formulae so that your Eastwood wire will have the longest possible life.

Because the Eastwood-Nealley plant is a *completely integrated* one, every wire we ship has undergone thorough and continual analysis, control and testing from the raw metals to your finished fourdrinier wire ready for quality paper production.

We are proud to say they are *truly ours*—"from ingot to fourdrinier wire".

EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

D. Samuel Gottesman

D. S. Gottesman

D. Samuel Gottesman, president and director of Gottesman & Co. Inc., died April 21 at New York, N. Y. He was 70 years old.

Closely associated with the world pulp and paper industry, Mr. Gottesman was also a director of Rayonier Inc. and Eastern Corp.

He was also active for several decades in the investment banking field both in this country and abroad. Thirty years ago he was an organizer of Central National Bank of the City of New York and became its board chairman.

Charles W. Harrold, former vice president in charge of engineering for Harris-Seybold Co., died in Cleveland recently at the age of 75. In nearly 50 years with Harris-Seybold, Mr. Harrold became holder or co-holder of 64 U.S. patents in the printing equipment field. In 1921 he designed and built the first successful two-color offset press and later supervised engineering on the first four-color unit in the country.

Robert G. Whale, owner of Whale Safety Paper Co. in Waupaca, Wis., died in April while on a business trip to New York, N. Y. Prior to organizing his own firm in 1946, he had been associated with Fox River Paper Corp. and Gilbert Paper Co.

Ray B. Keller, for 30 years printing supervisor for Hammermill Paper Co. in Erie, Pa., died early in April. He was 53. A 1924 graduate of Carnegie Institute of Technology, he joined the Hammermill staff in 1926.

Alfred A. Halden, 61, executive vice president and director of National Starch Products Inc., died recently at his New York, N. Y. home. He joined the National Starch staff in 1919 and in 1942 was elected vice president in charge of manufacturing.

George J. Maye, 61, vice president of Appleton Wire Works Inc., was killed April 8 in an automobile accident near Sarasota, Fla. He had been affiliated with the Appleton, Wis. firm since 1928.

NEW PRODUCTS

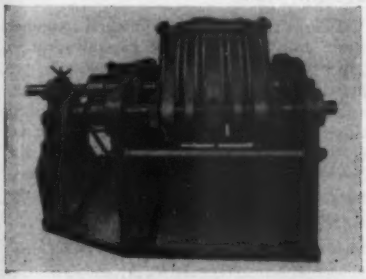
11/ Use readers' service card.

Vacuum regulator and breaker

A vaccum regulator for use on non-corrosive liquids and gases is designed to maintain a lower vacuum in the line than that received from the source. Valve inlet connects to the line; the outlet connects to the source. Changes in controlled vacuum produces valve movement, thus maintaining the correct inlet vacuum within very close limits.

The vacuum breaker is designed for limiting a maximum vacuum or holding a predetermined vacuum by automatic admission of atmosphere (or other gases and liquids) when slight changes in vacuum conditions occur.

Both valves are self-contained, self-actuated valves with full range of 0 to 30 in. Hg; supplied in pipe sizes ½ to 1¼ in. inclusive. *A. W. Cash Valve Mfg. Corp.*



12/ Use readers' service card.

Unwind brake

A new multiple disc water-cooled unwind brake for Kidder winders and rewinders is now available on all models requiring higher braking capacity. The unit is designed to accommodate either 15-or 20-in. diameter braking elements, and is also adaptable for assembly as a 2-, 3- or 4-disc unit.

Braking action is controlled pneumatically from the operator's control panel. Operation requires compressed air at only 30 psi maximum pressure. Standard equipment includes a water pressure reducing valve, permitting connection to any available water supply for cooling purposes. *Kidder Press Co.*

13/ Use readers' service card.

Speed reducers

Shaft-mounted speed reducers, with capacities from 1 to 60 hp and output speeds from 12 to 365 rpm, are now offered by Dodge. The new size No. 8, in the double reduction series, extends all the advantages of shaft mounting, plus other Dodge features to big jobs. The No. 8 has a capacity of 60 hp at 100 rpm and can be mounted on shafts up to 5 in. in diameter. At the other end of the line is the new No. 11, with a capacity of 1.3 hp at 100 rpm.

No foundation, no flexible couplings, no sliding base is required for any of these reducers, and there are no lining difficulties. The reducers are mounted directly on the shaft, and the Torque-Arm is fastened to any fixed object, anchoring the reducer. *Dodge Mfg. Co.*

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

14/ Use readers' service card.

Plastic cutting sticks

A new cutting stick for paper cutting machines is made of a milk-white plastic, machined and planed to tolerances of .001 in. The plastic is flexible, odorless, nontoxic and flame-resistant.

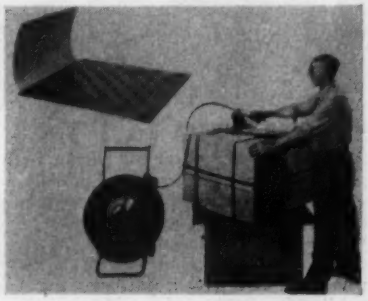
Use of the new stick cuts knife grinding costs by a great per cent because uniform density and "give" of the plastic keeps the knives sharp much longer. Knife nicks are minimized and down-time for knife replacement is reduced. The plastic will not chip, split, or warp under operating conditions and is said to last five times longer than wooden sticks. *Harris-Seybold Co., Special Products Div.*

15/ Use readers' service card.

Water conditioner

This water conditioner applies nuclear physics principles to the treatment of industrial water problems. Scale and corrosion formation is prevented by imparting added energy to the atoms of the water solution. The conditioner has no moving parts and employs no chemicals.

Standard sizes handle from 6.5 to 1760 gpm for connection with corresponding standard iron pipe sizes ranging from 3/4 to 12 in. diameter. Larger sizes are available. All conditioners carry a ten-year warranty. *Packard Conditioner Div.*



16/ Use readers' service card.

Strapping table top

This strapping table top enables the operator to stand in one position while rotating heavy containers for packing or strapping. The table top may be mounted on a permanent or portable base or in conveyor lines. A metal strap guide can be used as optional equipment to facilitate feeding the strap.

The 36-in. square table top contains sixty-one 1-in. ball casters which extend ¾ in. above the table surface and are mounted in a staggered pattern on 3-in. centers. *Signode Steel Strapping Co.*

17/ Use readers' service card.

Plastic wiring duct

A new type control panel conduit featuring a slot design which reduces wiring time has been developed. This slot design introduces a simplified method of inserting and removing wires—the wires are snapped in and out of the duct. It also permits the attachment of lugs before the wire is inserted and allows the wire to be removed with lugs attached.

Both duct and cover are held, and the internal nut and bolt arrangement eliminates external projections. The plastic wiring duct is highly insulating and will not warp due to moisture, heat, etc. *Panduit Co.*

18/ Use readers' service card.

Electric recorder

A line of recording millivoltmeters and microammeters has a measuring element that is more than 50,000 times more powerful than conventional direct-deflection movements, giving the pen drive mechanism

New Products . . .

ample power to operate alarm contacts with no loss of accuracy. Designed in the "graphic" style, the recorder uses a 3-in. wide chart in panel space of less than 25 sq. in. Continuous strip charts or IBM type card charts are available.

It is available, as a microammeter, in ranges from 0-200 microamperes to 0-100 milliamperes. As a millivoltmeter, the range is 0-20 millivolts to 1-100 volts with input sensitivity to 6700 ohms per volt. *Industrial Controls Div., Manning, Maxwell & Moore Inc.*

19/ Use readers' service card.

PVC pipe cement

A new solvent cement for joining PVC pipe fittings and flanges makes possible a joint as strong as the pipe itself, and will bridge a greater diametral gap than previously available bonding agents.

The cement is applied with an ordinary paint brush. The cemented joint can be handled in an hour and reaches working strength in 48 hours. It is available in pints, quarts and gallons. *Tube Turns Plastics Inc.*

20/ Use readers' service card.

Electronic conveyor scale

This new type "H" weightometer incorporates the important feature of continuous integration found in Merrick mechanical weightometers. The type "H" is extremely sensitive to load variation and has a steady no-creep zero balance. It is designed for heavy duty continuous service. Thoroughly field-proven, it is adaptable for control of auxiliary equipment. *Merrick Scale Mfg. Co.*

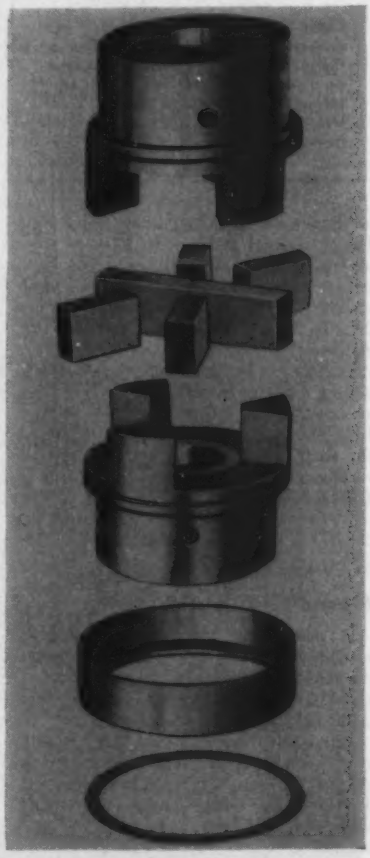
21/ Use readers' service card.

Three-knife trimmer

This new trimmer features as standard equipment a new automatic two-up device. In one operation it splits the pile and trims a lift of work bound two-up. While one-half is trimmed on all three sides, the other half is automatically returned to the operator for completion. During the entire operation the pile remains firmly clamped in position. The long shear angle guillotine knife action cuts smoothly and accurately.

Lifts as high as 4¾ in. in sizes 2 x 3⅛ in. to 11¾ x 16⅞ in. are trimmed automatically at speeds from 12 to 25 piles a minute.

An overload device is standard equipment. Moving parts are enclosed for safety, and the machine can be stopped at any point during the cutting cycle. *E. P. Lawson Co. Inc.*



22/ Use readers' service card.

Flexible coupling

A new radially removable flexible coupling provides easy assembly and disassembly. It is lubrication-free and especially suited to centrifugal and impeller pumps. Six sizes are available, ranging from 2.58 to 29.6 hp at 100 rpm. All feature reversible cushions to double service life on unidirectional loads. *Lovejoy Flexible Coupling Co.*

23/ Use readers' service card.

Air brush

The S.D. Warren air brush which has been widely used in the aqueous coating industry will now be manufactured and sold as a product of the Dilts Div. of the Black-Clawson Co. and will be known as the Warren-Dilts air brush.

It is used in connection with coating machines on aqueous coatings where coating weight control and smoothness are essential. It will now be furnished as a component part of Dilts' standard roll coating machines or as an auxiliary for existing equipment. The air brush is available as a standard unit in widths ranging from 15 to 120 in. with larger sizes provided if required. *The Black-Clawson Co., Dilts Div.*

24/ Use readers' service card.

Restricted port opening

A line of Ratogate control valves is now available with interchangeable restricted port openings for varying service conditions. The restricted port consists of a plate with the desired opening which can be readily inserted between the flanges on each Ratogate casting. Insertion does not affect the length of the valve stroke or the uniform flow characteristics.

No special provision is necessary to incorporate the plate; it can be used with all models of Ratogate valves. Restricted ports are available with areas as small as one-half the standard port area for each valve size. The non-plugging feature of the Ratogate design is retained. *Fischer & Porter Co.*

25/ Use readers' service card.

Steam trap

This cast semi-steel integral strainer steam trap is for use at pressures up to 250 psig. Capacity is 3500 to 4400 lb. per hr. of condensate. Side inlet, side outlet, screwed pipe connections are furnished either ¾ or 1 in. Standard screen material is stainless steel, perforated .045 in. dia. holes, 226 per sq. in. Other screen materials are available. *Armstrong Machine Works.*

26/ Use readers' service card.

Lift truck

The operating advantages of Hyster's monomast lift truck are now available on a pneumatic-tired truck of 2000 lb. capacity at 24-in. load centers. The single-upright assembly permits faster load placement, better visibilty, reduced driver fatigue and greater safety. Compactness and maneuverability allow the truck to work rapidly in narrow aisles and crowded warehouse areas.

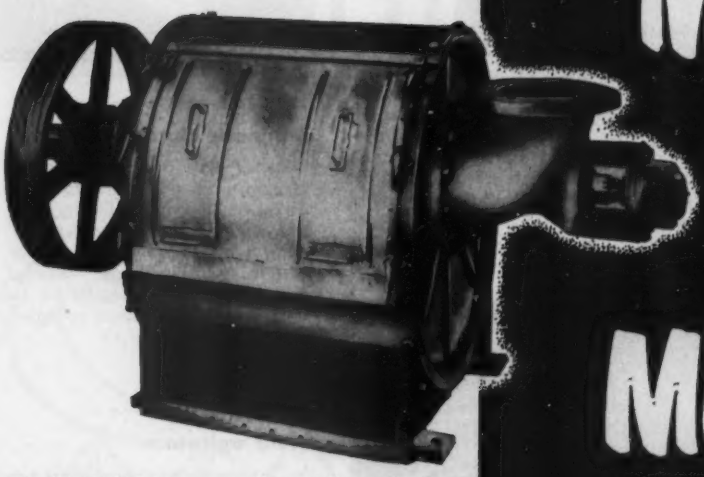
All the company's hydraulic attachments can be mounted on the attachment carriage. The upright assembly can be field installed on current models. *Hyster Co.*

27/ Use readers' service card.

Filter housings

Newly engineered filter housings have been designed specifically for high capacity diesel full flow lube systems. Features of the new design are easy maintenance, effective micronic filtration, high flow rates and lower cartridge replacement cost. The quick opening cover design has been designed for fast and easy cartridge changes.

Cartridges used in the new housing is



The "Junior" Screen . . . smallest of *three* units producing from 35 to 150 tons per day, respectively.

Money Saving Midgets

Cowan Centrifugal Pulp Screens by
APPLETON MACHINE COMPANY

Added efficiency, greater economy are the watchwords for *Appleton Machine Company's* junior versions of the standard Mark "A" Cowan Centrifugal Pulp Screen, acknowledged as outstanding in its field.

The Mark "E" Screen is a half-sized model of the standard Mark "A", conservatively rated at a capacity of 2400 U.S.G.P.M. accepted stock. 50 h.p. is required to operate the Mark "E", but its drive is designed to accommodate a 60 h.p. motor, wherever needed. The Mark "E" is particularly advantageous in smaller mills, or as a supplementary screening unit. Also, installing two Mark "E" Screens—instead of a single larger machine—provides a definite safety factor in case of breakdown.

The "Junior" Screen is a quarter-sized model of the big Mark "A", with a rated capacity of 1400 U.S.G.P.M. accepted stock. 25 h.p. operates the "Junior" Screen, but it will handle motors up to 40 h.p. Greatest applications are as secondary screening units, and as a primary screen for mills producing a variety of pulp grades which require a system made up of small, separate units.

Performance of these two Cowan Screens is comparable in every way to that of the standard Mark "A" Screen . . . the same high consistency screening . . . low percent rejects . . . good fiber separation . . . low shower dilution pressure . . . top hydraulic efficiency. Typically sound *Appleton Machine* construction plus a protective coating tailored to fit your needs *complete* your assurance of long-time satisfaction.

CUSTOM-BUILDERS OF PULP & PAPER MILL MACHINES
WINDERS • FINISHING ROLLS • REWINDERS

the Cuno Micro-Klean replaceable type, which are produced with graded density construction for greater dirt holding capacity and long life. Degrees of filtration are from 5 to 50 microns.

Flow rate for single housing of the largest in the series is 500 gpm of clean oil at 150 SSU, 25 micron filtration and a pressure drop of 2 psi. *Cuno Engineering Corp.*

28/ Use readers' service card.

Core tester

A core testing machine which performs both a flattening and a twisting test on all types of paper cores makes it possible to prevent roll damage from faulty cores. By use of the tester, quality control can be maintained during production and new cores can be developed with predetermined strength characteristics. The compact, easy to operate device was developed by the Tampella Machine Works of Finland and is available through their North American representatives. *Jay Madden Corp.*

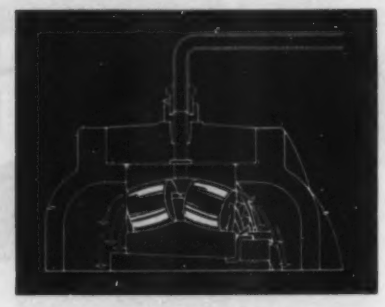
29/ Use readers' service card.

Water pressure reducing valve

This direct-operated water pressure reducing valve can regulate water flow to such fast-acting equipment as flushometers and snap cocks. It incorporates a high pressure molded diaphragm and heavy spring chamber construction for operation in the reduced pressure range between 30 and 80 psi.

New Products . . .

Especially designed for dead-end water service where flow is intermittent and subject to abrupt fluctuations, the valve features a balanced single seat to minimize variation in delivery pressure resulting from varying inlet pressure; packless construction to eliminate stuffing box friction, and a composition single seat providing for dead-end shut off and preventing pressure-creep when no flow is required. *Spence Engineering Co. Inc.*



30/ Use readers' service card.

Bearing lubrication

Longer bearing life may be possible with the introduction of a design change which provides for the more efficent center lubrication of a bearing instead of side lubrication. All spherical roller bearings 240 mm O.D. and larger manufactured by SKF will be equipped with lubricating holes in the outer ring—a feature formerly available on a customer-job basis only.

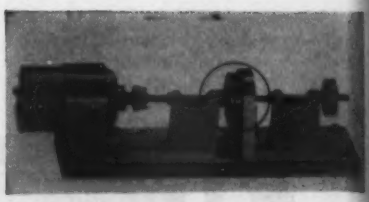
A flow of lubricant from the middle of the bearing toward the outside flushes out old lubricant and any abrasive dirt or dust. The new flow path also prevents the entry of dirt into the bearing and makes it easier for lubricant to reach all working surfaces. *SKF Industries Inc.*

31/ Use readers' service card.

Synchronous induction motor

A basically new synchronous motor is available in ratings from ¼ to 40 hp, built on standard induction motor frames and enclosures, and uses a simple die-cast rotor.

The motor requires no brushes, slip rings or windings on the rotor, separate source of direct current excitation, or special starting equipment as is the case with standard synchronous motors. It starts as an induction motor with a very high lock-rotor torque, accelerates and pulls into synchronism quickly, and runs as a synchronous motor. Having a high (175 to 200 per cent) pull-out torque, the motor remains in synchronism regardless of load or line voltage fluctuations. Only standard across-the-line starting equipment is needed, except in the very largest ratings, where reduced voltage starters are required. *Allis-Chalmers Mfg. Co.*



32/ Use readers' service card.

Magnetic clutch

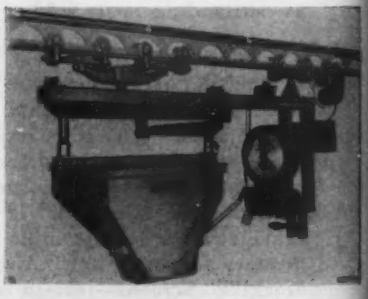
A new type permanent magnetic clutch requires no electric current for its operation except for an impulse for engaging or disengaging. Control button requires only a light touch and no pressure. The clutch will be available in the fractional horsepower range and eventually for larger applications. Remote control operation is possible. *Locke Machine Co.*

33/ Use readers' service card.

Fluid agitators

One manufacturer now offers a completely integrated, "packaged" fluid agitator service. The company manufactures impellers, shafts, drive supports, all gears, and reducer housings and maintains extensive testing and field servicing facilities to solve any fluid agitator problem.

Some of the features of a new line of fluid agitators are: low headroom design—maximum bearing span with minimum headroom; helical change gear set, within housing, allowing for ready selection of up to 14 different standard speeds; heavy-duty output shafting; heavy-duty inboard bearing support; spiral bevel gears of hardened steel; dry-well construction to prevent oil leakage down output shaft. *Philadelphia Gear Works Inc.*



34/ Use readers' service card.

Traveling hopper

A tractor-driven traveling hopper with scale is designed for handling bulk materials. The hopper has 1 cu. yd. capacity and is located with respect to its track so that an extra large opening is provided for filling. It is emptied by means of a bottom gate manipulated from both sides of the bucket.

Its 5000 lb. dial scale with tare beam is equipped with spring clip markers for quick weighing of similar batches. The unit is propelled by a tractor drive at 150 fpm. *Cleveland Tramrail Div., Cleveland Crane & Engineering Co.*

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- You save spoilage. Wet end warning light indicates emergencies as soon as they affect caliper . . . often prevent costly sheet breaks.
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It provides instant regulation of steam flow to the dryers with minimum fluctuation in accordance with moisture content of the sheet passing over the dryers . . . maintains any steam pressure desired when paper is off the machine for start-up, wash-up, or wet end break.

The system records or indicates moisture variation of the sheet, steam pressure in the dryers, and time and duration of wet end breaks. All controls and indicating instruments are grouped conveniently in one instrument panel. There are no hydraulic pistons, chains, pulleys or weights.

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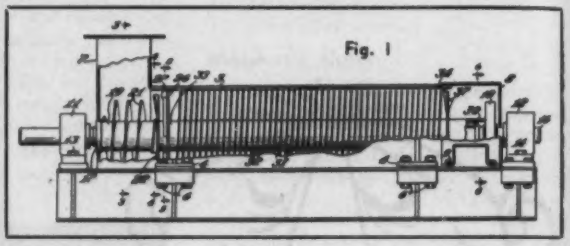
PATENT REVIEWS

MELVIN NORD*



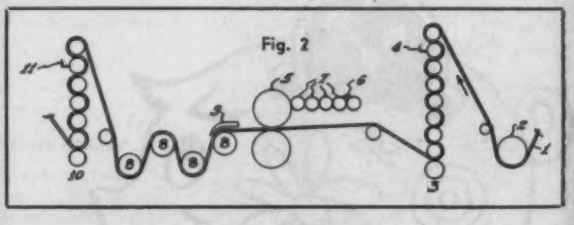
Refining machine

U.S. 2,722,163, issued Nov. 1, 1955, to Edward H. Cumpston Jr., and assigned to E. D. Jones & Sons Co., describes an apparatus for refining paper-making pulp.

The advantages claimed for the apparatus include the following: (1) low power consumption, (2) controllable severity of the working action, and (3) rate of flow through the apparatus controllable solely by the input rate.

The apparatus is shown in Fig. 1. At the inlet end a tube 19 is fitted over the shaft 16. Fastened to the tube 16 is a spiral rib 21 for feeding pulp into the chamber 3. Abutting the end of the tube 19 is an impeller in the form of two blades 22 arranged at right angles and welded together so that the blades also tend to feed the pulp into the chamber 3. Spaced from the impeller 22 by a spacing ring is a banger 26 having ribs 27 fastened to the inlet side and notches in its periphery. The device serves to break up the entering chips or other pieces of material, thereby protecting the refining elements.

Following the banger 26 is a series of serrated disks 31 which are spaced from each other by spacing rings 32, the first disk being spaced from the banger 26 by spacing ring 33. The disks preferably turn in the direction opposite to the direction in which the rakes point so that fibers do not catch on the teeth. The disks are mounted at an angle to the axis of the rotor so that they wobble back and forth as the shaft rotates. Mounted on the outlet end of the shaft is a retarder 34 plate which prevents surging.



Process of finishing mineral-adhesive coated paper

U.S. 2,725,307, issued Nov. 29, 1955, to Brainard E. Sooy and Harry C. Fisher and assigned to The Gardner Board & Carton Co., relates to the problem of producing wet-type calendered finishes on paper or box-board coated with adhesive-mineral coatings, and has for its objects the obtaining of superior finishes, improved physical properties and certain new effects.

In Fig. 2, a web of paper or paperboard 1 is shown leaving the last roll 2 of the heated drying rolls of a paper machine and passing to a calender stack 3. A plasticizing solution of starch or starch and polyvinyl alcohol is applied to the surface of the web on the calender stack by means of one or more water boxes 4; and the result of the action of the calender roll nips of the stack on the

*Patent attorney, 17600 Pinehurst, Detroit 21.

treated surface of the web is to plasticize it and prepare it for the reception of the mineral coating. The mineral coating is applied promptly while the surface of the web retains its plasticity, by means of an imprinting roll 5, receiving the coating mixture from a supply 6 by means of metering and doctoring rolls 7. The coated board then passes to a series of heated drying rolls 8. Adjacent the first of these there may be a hood 9 where hot air may be blown against the coated surface of the board to accelerate the initial drying before that surface contacts the second drying roll.

In one or more water boxes 11 on the finishing calender stack 10, the inventors employ water containing an organic agent modifying the rate at which the water can dissolve or soften the adhesive of the mineral coating previously imposed on the board. An alcohol-water solution, by way of example, is relatively volatile, and since the solutions in the calender water boxes tend to become warmed from the heated condition of the paper or board passing through the calender stack, the solution should be handled in such manner that its alcohol-water ratio is preserved. This is best done by balancing the flow of solution to the calender nip with its consumption in the nip so as to minimize the quantity of the solution subjected at any time to heating effects productive of evaporation. The solution applied in the water boxes 11 may contain wetting or penetrating agents, acidic or alkaline materials, soluble or dispersible dyestuffs or coloring matters, as well as small amounts of film-forming substances that promote gloss imprinting, such as polyvinyl alcohol, soluble celluloses like carboxymethyl cellulose and hydroxy-ethyl cellulose, alginic substances, proteins, starches and the like.

It has been found that a finishing calender surface application of the alcohol-water type of solution with the solution slightly acidified, promotes flat printing with oil or varnish base inks without sacrificing the high quality of gloss ink printing or over-varnishing where otherwise obtainable. A similar action appears to take place with paper or board which has not been coated with mineral adhesive coatings; but a critical feature here is that acid treatments against a cellulosic surface may be undesirable, especially as the board or paper ages. An acid treatment applied over the coating however, does not adversely affect the quality of the board, while producing the printing effects described.

According to the inventors, a number of advantages result from their process. Whereas starch-mineral coated surfaces, particularly those which are not waterproof, when given conventional dry calender finishes, marred and marked easily when rubbed or passed over mechanical parts of machinery, scored with the fingernail, and the like, the same coating, calender finished with the alcohol-water type of solution no longer can be marked easily. The coated surface has become harder, smoother and glossier and in such condition performs better where two coated surfaces must rub and turn upon each other. This procedure results in producing a smooth, glossy, sized, coated surface on the web, in which the pattern of the coating is largely reduced, the coating having been softened by the solution applied on the calender rolls, then smoothed and compacted by the calender roll nips. The resulting sheet has greatly enhanced printing qualities, good appearance, and can be as bright and white as desired, or can be colored to desired hues.

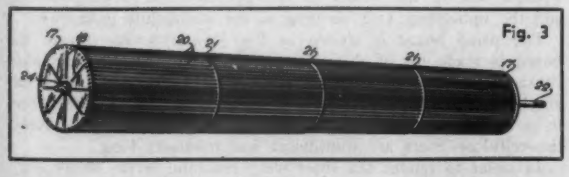


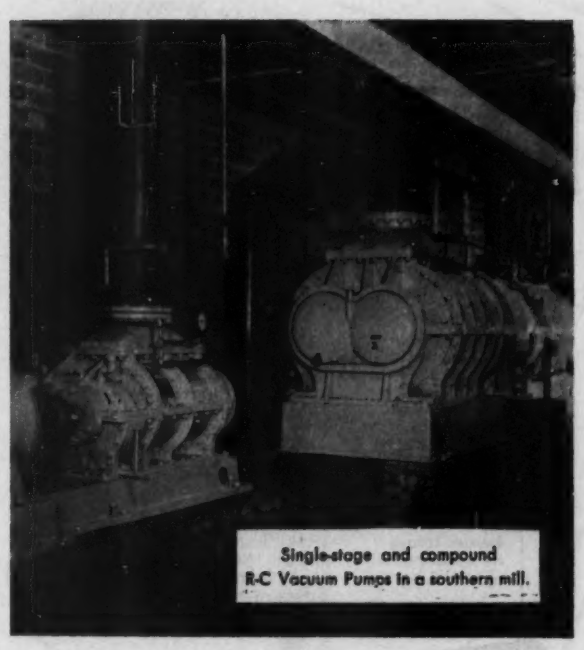
Fig. 3

Deflocking roll for paper machine headboxes

U.S. 2,722,164, issued Nov. 1, 1955, to Robert D. Duncan and assigned to Canadian International Paper Co., describes a device for breaking up floc formations which develop in a stock suspension moving under "frozen flow" conditions.

The deflocking roll shown in Fig. 3 includes a pair of header or end discs 17, provided on their outer faces with scraper bars 18 which may also serve to minimize flexing of the discs. A number of holes are drilled through each disc 17 to receive the ends of small diameter rods or tubes 20 to form together with the header discs 17 a cage-like roll. The central portions of the rods 20 are held by thin spacer discs 21.

The action of the deflocking roll is to introduce many shear



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Patent Reviews . . .

zones (turbulence) of uniform pattern and strength across the full width and depth of the "frozen flow" body of stock moving in the channel. The uniformity of the pattern of this turbulence and its strength are such that the body of stock again assumes a "frozen-flow" condition a short distance downstream from the defloccing roll and the floc size is uniform and has been greatly reduced or eliminated.

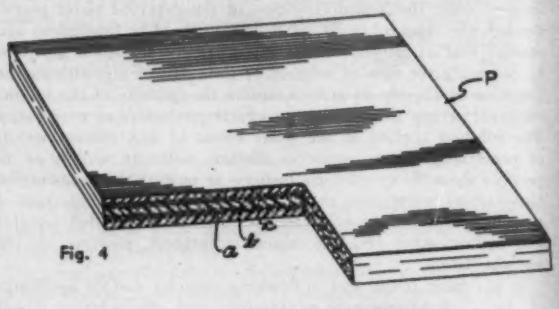

Fig. 4

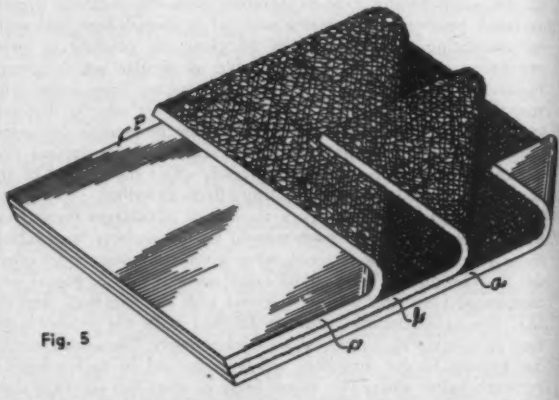

Fig. 5

Asphalt-impregnated kraft paper panel board

U.S. 2,721,816, issued Oct. 25, 1955, to Robert H. Wood and assigned to Simplex Paper Corp., describes an improved type of panel board which can be handled and sewed satisfactorily without soiling the hands of the operator, the sewing needle, and the upholstery (e.g. as used in the automobile industry).

The panel board is shown in Fig. 4 and 5. As shown, the board is made up of three plies a, b and c. Each of the plies consists of a sheet of kraft paper of suitable thickness, as for example .016 in., produced from sulfate pulp having cellulose fibers in a single layer extending equally in all directions. Preferably, the cellulose fibers are continuous and relatively long.

In order to render the sheet water-resistant, it is "hard-sized". The exposed surfaces of the plies a and c are smooth and hard, obtained by calendering, whereas the inner or unexposed surfaces have outwardly protruding fibers. These protuding fibers cooperate with an adhesive for bonding the several plies together. The adhesive is placed between the several plies and is absorbed by the board. A satisfactory adhesive for this purpose may be a mixture of latex and starch paste, the latter containing water as a solvent. The panel board is subjected to some pressure to hold the plies together until the adhesive has had sufficient time to set.

Prior to the assembly of the sheets, each sheet is impregnated on the two sides with asphalt at a temperature of 450°F. The asphalt upon cooling should be exceedingly hard and brittle, so that it should have a melting point of approximately 180°F. and a pentration point of from zero to one. With an asphalt

impregnated kraft paper sheet having a penetration point of zero to one, a needle penetrating the panel board for the purpose, for example, of sewing fabric upholstery material to the board, will actually punch out a hole through the material because of the brittleness of the asphalt. This militates against any of the asphalt adhering to the needle and thereby soiling the upholstery fabric during the sewing operation.

The elimination of the protruding fibers from the exposed flat surfaces of the panel board is a definite advantage in that it prevents staining of the hands of the workmen and the consequent dirtying of the upholstery material.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Apparatus for forming open-ended cartons	Oswego Falls Corp.	2,726,583	12/13/55
Carton blank forming machine	Gaylord Container Corp.	2,726,584	"
Packing drum	Inland Container Corp.	2,726,803	"
Paper bag with ticket retaining and mouth closing means	Equitable Paper Bag Co. Inc.	2,726,804	"
Photographically sensitive diazo paper	H. P. Andrews Paper Co.	2,726,956	"
Paper-backed adhesive tape	Permacel Tape Corp.	2,726,967	"
Machine for testing the strength of paper	Crosby Steam Gage & Valve Co.	2,727,386	12/20/55
Refining apparatus	E. D. Jones & Sons Co.	2,727,440	"
Pulp screens	Combined Locks Paper Co.	2,727,444	"
Apparatus for the manufacture of paper	Sandy Hill Iron & Brass Works	2,727,442	"
Wood shredding machines	Allwood Inc.	2,727,542	"
Shirt packaging form	Market Industries Co. Inc.	2,727,618	"
Carton convertible into display holder	General Electric Co.	2,727,619	"
Collapsible display carton	Sutherland Paper Co.	2,727,620	"
Cartons	Unipak Cartons Ltd.	2,727,653	"
Lining for a liquid-tight heavy duty fiber container	Continental Can Co. Inc.	2,727,673	"
Collapsible carton	Federal Carton Corp.	2,727,674	"
Shipping container	Waldorf Paper Products Co.	2,727,675	"
Container closure structure	James O. Tilly	2,727,676	"
Bottle case	Waldorf Paper Products Co.	2,727,677	"
Regulator system for pulp refiner	Westinghouse Electric Corp.	2,727,694	"
Web tension measuring apparatus	The Champion Paper & Fiber Co.	2,728,223	12/27/55
Tester for paper surfaces	Lithographic Technical Foundation	2,728,224	"
Stock inlet for paper machine	The Black-Clawson Co.	2,728,271	"
Stock inlet for paper machine	Sandy Hill Iron & Brass Works	2,728,272	"
Suction boxes	The Black-Clawson Co.	2,728,273	"
Machine for squaring box blanks	Samuel M. Langston Co.	2,728,274	"
Machine for making fibre drums	Fibre-Drum Corp.	2,728,275	"
Compartmental cartons	The Spitzer Paper Box Co.	2,728,449	"
Combination carton and cup carrier	American Seal-Kap Corp. of Delaware	2,728,484	"
Bottle carrier	Atlanta Paper Co.	2,728,495	"
Wire guide device for papermaking machines	Gilbert & Nash Co.	2,729,111-2	1/3/56
Impellers for pulp disintegrating machines	Kurt Wandel	2,729,146	"
Multiple sychronized pneumatic paper stock control device	John W. Bolton & Sons Inc.	2,729,147	"
Mechanism for inserting a sleeve in a bag valve	The Raymond Bag Co.	2,729,148	"
Multi-ply bags	St. Regis Bates S.A.	2,729,150	"
Transfer mechanism for bag-making machines	International Paper Co.	2,729,151	"
Doctor blade for paper-coating apparatus	The Champion Paper & Fibre Co.	2,729,192	"
Machine for making edge embossed paper article	Hoffmaster Co. Inc.	2,729,267	"
Purification of paper mill white water by froth flotation	Zschimmer & Schwarz	2,729,334	"
Shipping carton	Liftainer System Co.	2,729,383	"
Containers	Gaylord Container Corp.	2,729,384	"
Closure for containers	George A. Moore	2,729,385	"
Spiral paper folding device	William M. Webster	2,729,445	"
Lignin-tanned leather	Hans Ehrensperger	2,729,534	"
Wet strength paper containing amino-aliphatic chain polymer resins	American Cyanamid Co.	2,729,560	"
Blowing dry starch into a papermaking furnish	John C. Marrone	2,729,561	"
Production of thermosetting synthetic resins capable of imparting improved wet strength to paper	Allied Chemical & Dye Corp.	2,729,617	"

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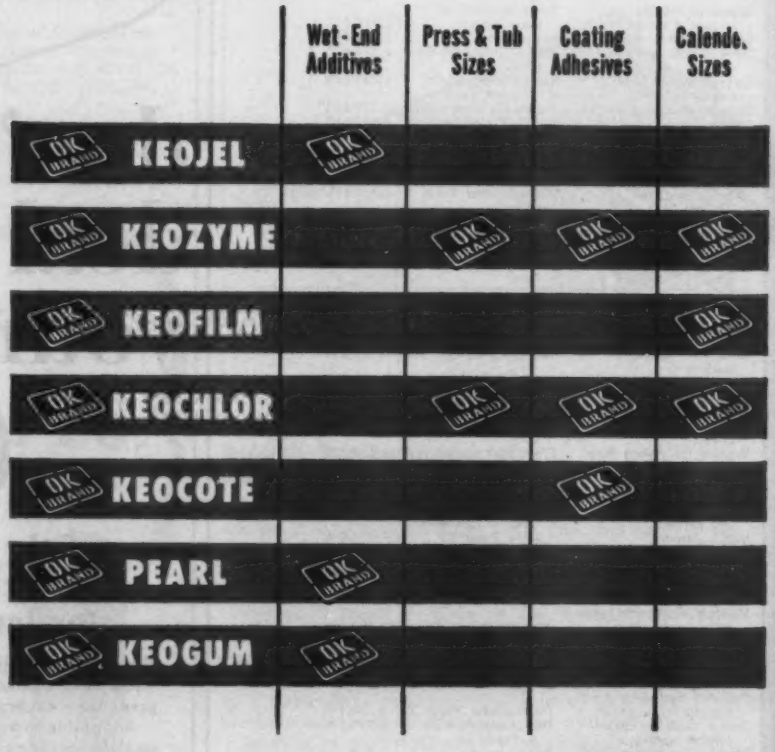

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FOREIGN ABSTRACTS

Contact angles of water on paper

Recent theoretical approaches to the study of contact angles on rough surfaces and their measurements on non-homogeneous surfaces are reviewed, and the contact angles of water on paper surfaces are discussed fully. The surface of a sized paper sheet is considered "rough" and as being composed of hydrophobic rosin (or of aluminum resinates) mixed with areas of the hydrophylic and water absorbent cellulose. Although it is difficult to interpret the contact angles on such a surface, the contact angles of water on paper do represent a definite surface property, provided that the sheet is sufficiently well-sized so that any water absorption during the 10 seconds required for the measurement can be neglected. Precautions required, the details of the measurements, and an improved apparatus are described.

The set-up of the instrument is shown in Fig. 1. From right to left are shown a projection lamp with infra-red filter attachment, a micrometer buret, a centrally located, raised table which holds the paper sample, a microscope tube and a projection glass screen with a scale.

Another figure (not reproduced here) shows the actual projection of a water droplet on the screen and the means used in measuring its altitude and base. A convenient nomogram is given for finding rapidly the contact angle of a droplet having a definite altitude and base. Eighteen references and seven figures are included. Ernst Back and Börje Lundin. *Svensk Papperstidn.* 58,758-763 (1955) (original in Swedish with English summary).

Thermoboards; the developments and effect of thermal reactions on wood

The authors discuss the physical, morphological and chemical fundamentals involved in thermoboard production. These boards are obtained when air- or oven-dried wood fibers, chips, etc. are distributed evenly in trays and then subjected to pressures of 100-200 kg per square centimeter at 200° C., for 15-20 minutes. Experimental data are given for the conversion of thin aspen chips into pressed boards. The authors describe the chemical and physical changes undergone by the wood during this treatment. The thermal decomposition of the lignin gives rise to products which are considered the bonding agents that bind the wood particles together.

The properties of thermoboards and of synthetic resin-bonded wood-particle boards (made from the same aspenwood) are compared. In order to form thermoboards of sufficient strength, the intensity of contact between the individual wood particles must be high, and the resulting product has a rather high density. The same properties can be obtained with synthetic resin-bonded wood particle boards at lower densities. Wilhelm Klauditz and Günther Stegmann. *Holz Roh-u. Werkstoff* 13, 440-49 (1955) through *Bull Inst. Paper Chem.* 26, 437 (1956) (original in German).

Differences between beechwood from Jugoslavia and from Germany manifested in sulfite pulping

Marked differences were noted in the ease of delignification of beechwood from Jugoslavia (which pulped poorly) and that grown in Germany which was pulped readily by the calcium bisulfite process. The present author made a thorough study of the morphology of the two types of beech and found no appreciable differences in the wood structure. Analyses indicated that the Jugoslavian wood was actually lower in lignin (21.1 per cent) than was the German wood (24 per cent). Cellulose (determined by the Kurschner method) was also lower in the former than in the latter. On the other hand, the total extractives, the ash and the pentosan contents, of Jugoslavian beech were all considerably higher than were the corresponding components of the German wood. In certain instances a beechwood grown in France was also analyzed, but the three woods showed no conclusive differences when it came to holocellulose, their degrees of polymerization, or to the cuprammonium viscosities of the various holocelluloses.

The proportion of the so-called dark wood ("false" heartwood) of beech was much higher in the Jugoslavian sample than in the German wood. This dark wood also showed a reduced degree of pulping, and the pulp had a much lower G.E. brightness, retained more lignin, and gave higher screenings than in the case of the German dark wood, when identical cooking conditions were applied. Presumably the inferior pulp obtained from the Jugoslavian beech is attributable to its higher extractive content which is concentrated in the darkwood, as gaged by the intensity of color reactions. Although the structural formulas of possible phenolic extractives are given, only group color tests were applied, and no specific extraneous compounds were isolated.

Attempts were made to improve the pulping behavior of the Jugoslavian wood. Formaldehyde added to the cooking liquors caused no improvement, nor did the use of ammonium bisulfite in place of the calcium bisulfite chemical. Raising the maximum cooking temperature from 135°F. to 145°F., and at the same time lowering the time from two hours to one hour at the highest temperature, actually had a deleterious effect. Although improvements were noted when the cooking time schedules were increased, the Jugoslavian pulp was always inferior to the German pulp. A marked improvement was noted when the dark wood was separated and only the white wood was pulped, but even in this case the Jugoslavian pulp was somewhat poorer than the German pulp (prepared from the sap-

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wood). Longer liquor impregnation periods (six in place of three hours) with four hours at a maximum temperature of 135° caused a real improvement in the Jugoslavian pulp quality.

The significance of these data is discussed. Fifteen references, two figures and nine tables are included, as well as two half-tones of photomicrographs. Johannes Schmidt. *Wochbl. Papierfabr.* 83, 1025-32 (1955) (in German).

Standard viscose procedure advocated in Norway

The authors describe in great detail a tentative standard method for the formation of viscose. Three different high alpha pulps were used, and the method was devised after an extensive study of the effects of varying the per cent carbon bisulfide, alkali concentration, etc. The following steps were studied carefully: steeping, pressing, shredding, aging, xanthation, dissolving, evacuation, ripening and filtration. Precautions are given regarding temperature, time, analytical data, *et al* at every stage. Special attention is also given to the filter constant.

Among the important factors which were closely examined and discussed were the quality and composition of the steeping lye, the xanthation system and the concentration of applied carbon bisulfide, the composition of the dissolving lye, and the material used in the filtration of the viscose solution.

Ordinarily cotton filters are used, but some work was also done with a synthetic filtering material. If the latter is to replace the cotton filters, the following requirements are essential: (a) no important deviations from the straight line filtration law of Hermans and Bredee (Rec. Trav. Chim. 54,680 (1935), so that a short filtration period is possible; (b) the filtration law should also be fulfilled so that the K_w (i.e. the filter constant) values are independent of the viscosity level; (c) the filter should have a well-controlled porosity, so dimensioned that only one layer is ample for the filtration; and (d) the filterability of such a synthetic filter should have a reproducibility as good as that obtained with cotton, and should have the ability of differentiating the dissolving pulps in the same order as do the cotton filters with respect to K_w values.

Seventeen references. O. Ellefsen. P. A. Hallberg, and O. Jensen. *Norsk Skogind.* 10, 38-48 (in English).

Hydrotropic delignification

The literature on so-called hydrotropic pulping is reviewed. Aspenwood containing 19.8 per cent lignin was digested with water, with 40 per cent sodium acetate, and also with the hydrotropic agent, sodium benzoate. The cooks were carried out at 140° for 8 hours. The resulting wood residues were analyzed for lignin, and in a number of cases for pentosans, and the

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losses in these components resulting from the digestions were then computed. In the water hydrolysis only 6.5 per cent of the original lignin but over 50 per cent of the pentosans had been lost. On the other hand the sodium benzoate had removed 65 per cent of the initial lignin, whereas the sodium acetate had taken out relatively little lignin.

When the wood residue from the water digestion was then treated with cold 40 per cent sodium benzoate for 15 days, or with this solution for a short time at 70°, nearly 50 per cent of the lignin of the original wood was removed. When, however, the initial water digestion was omitted and the wood was treated directly with cold benzoate for 15 days, only 3.5 per cent of the lignin was lost. The authors give a composite flow chart showing all the treatments (i.e with water, sodium benzoate and sodium acetate).

In a number of instances lignin was recovered from the liquors after the digestions. All these lignin fractions showed very similar properties (e.g. 20.0-20.1 per cent methoxyl and nearly identical infra red spectra). In hydrotropic pulping the lignin appears to be taken out as the result of two distinct reactions. Aqueous hydrolysis occurs first and this is followed directly by solution in the hydrotropic solvent. The lignin removed hydrotropically is free from carbohydrates (to which it may have been linked initially). In the case of lignin taken out with water alone or with aqeous sodium acetate, this is believed to be still linked to sugar units.

In a series of tests the authors made up buffered solutions of various hydrogen ion concentrations. The respective pHs were 4.15; 3.75; 3.15; and 2.2. and digestions were carried out with these. The resulting losses in lignin were respectively 10.3; 10.7; 11.2; and 13.1 per cent of the lignin initially present in the wood. The losses in pentosans were respectively 66.7; 69.1; 72.5; and 83.7 per cent. In all these cases the ratio in loss of pentosan to loss in lignin remained practically the same (6.39-6.47), a fact which the authors claim furnished additional evidence for a lignin-polyose linkage in the original wood. P. Traynard and A. Eymery. *Holzforschung* 9,172-77 (1955) (in French).

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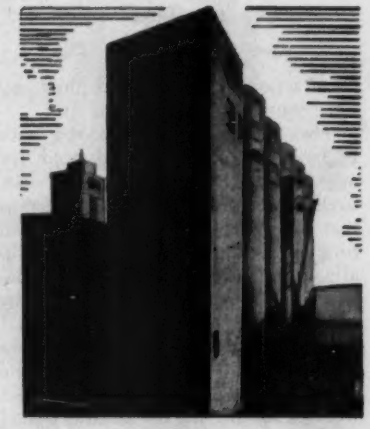
Blue gum (*Eucalyptus globulus*, Labill) grows in plantations in Madras, where the cutting cycle of 15 years appears to be suitable, and where the trees can be cultivated quite reasonably. The wood is not open to serious insect or fungal attack, and up to the present time (1955) has been used only as firewood. Blue gum lends itself well to sulfate pulping and bleached pulps could be formed in satisfactory yield. Average fiber length was 1.1 mm.

Printing paper from 100 per cent gum was made in a pilot plant at Dehra Dun, India, and showed good sheet formation and adequate strength properties. However, sheets formed on a commercial paper machine should contain a certain percentage of longer fibered material (such as bamboo pulp). Blue gum is recommended by the authors for white writing papers and for printing paper. A sample sheet made from 100 per cent blue gum is included in their article. R. V. Bhat and M. G. Karnik. *Indian Pulp and Paper* 10, No. 4, 215-20 (1955) through *Bull Inst. Paper Chem.* 26, 451 (1956).

Cupriethylene diamine as cellulose solvent

When using cupriethylene diamine (CED) as a solvent for cellulose in making viscosity determinations, certain types of pulp are difficult to solubilize completely. This is true when the ratio of ethylene diamine (En) to copper exceeds 2, and is manifested especially by cold-alkali-treated pulps and unbleached pulps having a high degree of polymerization. A method is described for the preparation of a CED solution containing 1 mole of copper. When a 5*N* solution of ethylene diamine was saturated with pure cupric hydroxide, this ratio of En to copper could be achieved and this solution had a good solvent action on all types of pulp. This solvent power decreased rapidly when the ratio exceeded 2, and the relative viscosity of a cellulose in CED solution increased with this increasing En to copper ratio. However, the composition of the CED solution could easily be kept within such limits that viscosity variations due to differences in solvent composition were less than 1 per cent. Karin Wilson. *Svensk Papperstidn.* 59, 88-92 (1956) (in English).



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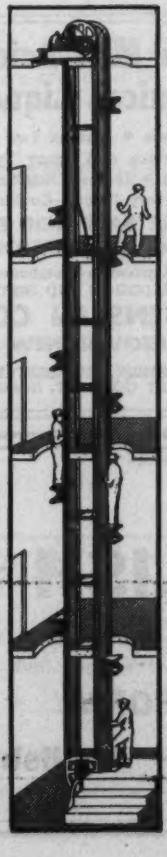

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Coatings

(Continued from page 127)

terial action. Most heat seal films, unlike many glues, are odor free.

The disadvantages connected with heat sealing are: (1) the need for more complex machinery, (2) the need for control of this machinery so that the three variables of temperature, time, and pressure are continually in balance and in the same relationship to each other, and (3) the resinous film may also tend to curl the paper; special precautions both in the manufacture of paper and in the application of the resinous gum, as well as in the storage of the coated paper, are required.

Of recent interest are the so-called "delayed-tack" adhesive films. This film, after activation with heat, remains tacky or sticky for a fairly long period even after the adhesive film has cooled to room temperature. This means that the label or wrapper to be sealed can be heated at one station and the bond can be made without application of heat at the second station. This is important for if heat is not required at the point of application of the coated paper, increased production speeds may be achieved.

Resins which are generally used for heat sealing purposes include polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate, partially hydrolized vinyl chloride-vinyl acetate copolymers ethyl cellulose, waxes alone and in combination with resinous materials, cyclized rubber, chlorinated rubber, rubber hydrochloride, polybutylenes, polyisobutylenes, and polyamides.

While a number of resins, alone or in combination, will impart the desired properties for a given application, the choice of coating is dependent on numerous factors. For instance, the equipment available for applying the coating may limit the manufacturer to a choice of two or three types of resins or coating materials. Drying temperatures, as will be seen in a subsequent article, are very important. Some of the resins, such as heat cured phenolics which impart excellent properties to paper, are seldom used because most paper coating equipment cannot provide sufficient heat to cure the phenolic resins. Cost is also frequently a limiting factor. Another important consideration is the physical properties of the coating. For example, a solvent solution may offer promise of providing exactly the properties desired but, because available equipment does not permit safe handling of solvents, the manufacturer may be forced to use a water emulsion instead.

Accidents

(Continued from page 130)

size that money spent on safety is a sound investment in industry. It will be returned many times through reduction of accidents.

Besides safety programs, a plant medical service is important in industry. Dr. Victor G. Heiser in this connection lists ten benefits: (1) good health and working conditions for employees; (2) increased mental and manual job efficiency; (3) decreased absenteeism; (4) fewer accidents; (5) lower workmen's compensation payments; (6) decreased turnover due to dissatisfied workers; (7) higher production; (8) increased customer satisfaction; (9) better public relations status; (10) increased personal satisfaction for the employer.

The National Association of Manufacturers, of which Dr. Heiser is medical consultant, has collected statistical data from plants having medical service.

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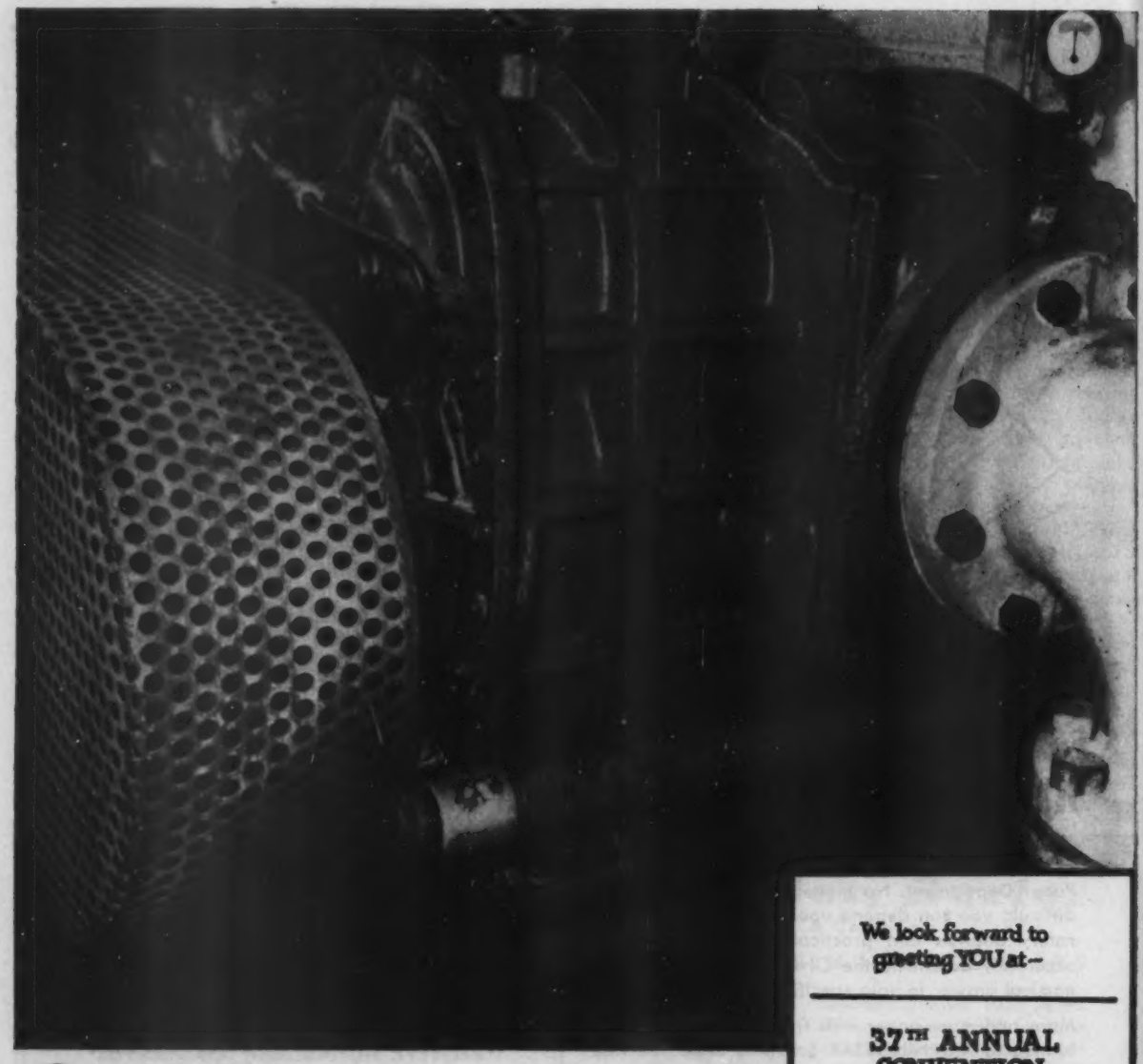

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The results of discussions on the following questions are included in this number of the Dechema-Erfahrungs-Austausch series: How can incrustation in evaporators be prevented; separation of metallic dust from PVC powder; filtration of highly viscous solutions; plastic tubes for use with concentrated nitric acid; SO_3 corrosion in boilers and its prevention; heat exchange in mould dryers; and the use of carbon fluoride compounds for the manufacture of packing and jointing.

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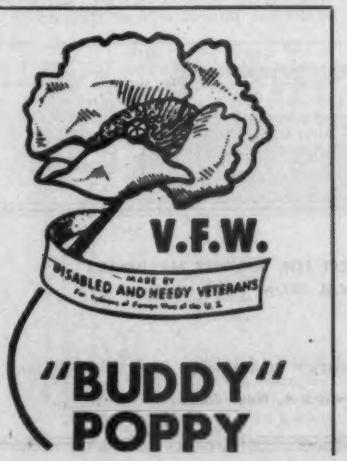
THE FOREST INSECT SITUATION, (Lake States 1955). By L. C. Beckwith and H. G. Ewan. Station Paper No. 35. Published by Lake States Forest Experiment Station, St. Paul 1, Minn. 8 x 10½. 15 pages. This report is a compilation of data from many sources to show the present forest insect conditions in the three Lake States—Minnesota, Wisconsin and Michigan. A tabular summary gives the degree of infestation of most insects in concise form.

PROCEEDINGS, LAKE STATES FOREST TREE IMPROVEMENT CONFERENCE, AUG. 30-31, 1955. (Misc. Report No. 40). Published by Lake States Forest Experiment Station, St. Paul 1, Minn. 8 x 10½. 108 pages. This bulletin consists of reports from various experiment stations, companies, universities and other groups on recent tree improvement research and papers presented in panel discussions on techniques related to research in tree improvement.

FOREST MANAGEMENT LESSONS FROM A 1949 WINDSTORM IN NORTHERN WISCONSIN AND UPPER MICHIGAN. By J. H. Stoeckeler and Carl Arbogast Jr. Station Paper No. 34. Published by Lake States Forest Experiment Station, St. Paul 1, Minn. 8 x 10½. 11 pages. The conclusions drawn from a survey of the October, 1949 windstorm have certain practical applications for the manager of forest lands, especially where timber marking guides and policies are concerned.



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Speed Reducers. Farrel-Birmingham Co. Inc. This 52-page bulletin is illustrated and contains full information about the complete line of Farrel speed reducers, which has been recently re-engineered, rerated and expanded. Included are horsepower rating tables, specifications, dimensions, weights and other data.

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Flexible Ball Joints. Barco Mfg. Co. This 20-page catalog gives many industry applications which highlight the versatility and economy of the ball joint. Included are complete engineering specifications and data. Screwed, flanged and welding end joints are listed, as well as insulating joints and jacketed joints. A section is devoted to piping problems, and maintenance or repair instructions.

48/Use readers' service card.
Manganese Steel Sprockets. Taylor-Wharton Div., Harrisburgh Steel Corp. A four-page brochure describes and illustrates the company's line of manganese-steel sprockets and points out the advantages of using sprockets with replaceable tooth segments.

49/Use readers' service card.
Data Sheet. Modern Engraving & Machine Co. A guide for determining the amount of dry solids in solution (color, plastic or adhesive) which will be applied by various types and depths of applicator rolls provides a reference table for those responsible for the metered application of these materials. The guide also discusses the advantages of electronic controlled precision engraved applicator rolls.

50/Use readers' service card.
Semi-Chemical Pulping. Bauer Bros. Co. This comprehensive manual contains an 18-page treatise by Eberhardt, patent and literature survey, reprints of 14 articles on the subject, sketches, flow diagrams and plant layouts, and bulletins of relevant Bauer equipment.

51/Use readers' service card.
Modern Multiple V-Belt Drives. Allis-Chalmers Mfg. Co. The origin, history and development of V-belt drives is discussed in this 36-page booklet, which also covers the evolution of standards in engineering V-belt drives, provides tables and data, and describes modifications. A number of questions relating to basic principles and practices pertaining to use of V-belt drives are answered.

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52/Use readers' service card.
Turbine-Type Pumps. New York Air Brake Co. An eight-page bulletin describes APCO Master turbine-type pumps, and shows assembled and exploded views to illustrate removable channel rings, spacer rings and impellers. There are cross sections of single and two stage pumps and construction specifications for parts requiring corrosion resisting alloys.

53/Use readers' service card.
Variable Speed Transmissions. Lewellen Mfg. Co. This new catalog illustrates and describes the company's infinitely-variable speed transmissions and classifies construction, accessories, and both manual and automatic controls. The engineering section indexes and tabulates characteristics, ratings and dimensions.

54/Use readers' service card.
Alloy and Stainless Steels. Electric Steel Foundry Co. Esco's catalog for the process and manufacturing industries has been increased to 102 pages to include corrosion resistant data, chemical composition, representative mechanical properties of corrosion resistant, heat resistant, impact and abrasion resistant alloy steels.

55/Use readers' service card.
Abitol. Hercules Powder Co. This 16-page booklet describes the physical and chemical properties of a high molecular weight, nonvolatile alcohol which is viscous and resinous. Also given are the current general uses and its use in alkyd resins.

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New England stationery and school supply converting plant has a position open for man experienced in operation functions of production and general management. Must be a capable administrator with a successful record in production and handling of personnel. In first letter give complete resume of experience, age, education, family, and desired salary. Your responsibility will be to the president of the organization. Reply to Box 629, The Paper Industry.

WANTED — one #4 Shartle Refiner; one Shartle Disintegrator (motor and starting equipment not required). Reply giving all particulars including price to Box 630, The Paper Industry.

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Want young man with college and about one year of mill experience. Travel does not exceed four months per year selling specialty equipment. Balance work in midwest factory office. Fine hunting and fishing area. Attractive compensation plan.

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3) Excellent living and working conditions — our new mill is located in central Florida, midway between Jacksonville and Daytona Beach.
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Send complete resume to Hudson Pulp & Paper Corp., Southern Division, Palatka, Florida, Attn: Personnel Dir.

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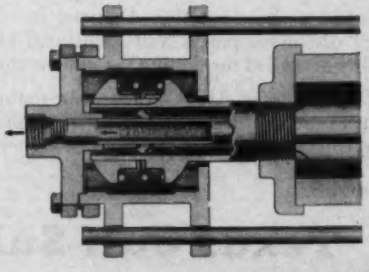
JOHNSON JOINT
ROD-SUPPORTED TYPE

The Type LJ Johnson Joint has lugs cast right on the body to accommodate supporting rods. This design lifts the weight of the body from the rotating assembly—permits it to "float" freely inside. Joint shown at left is for syphon pipe service, has steam inlet in side of body 90° from lugs. Type LJ is also available for thru flow service.



Write for complete information. Johnson Joints are also furnished in pipe-supported and self-supported types.

The Johnson Corporation
845 Wood St., Three Rivers, Mich.

Sulphur

helps to create headline products

ALUMINUM

Surely a 'headline product' even if not new! Aluminum is very much in the news today for it is playing a leading role in our steadily expanding economy.

What's all this got to do with Sulphur?

It's like a chain reaction. Demand for this remarkable light metal is increasing. This calls for more ore development and additional mills for the reduction of alumina to aluminum. More cryolite is needed for fluxing the molten alumina in the electrolytic cells.

True, cryolite (Na_3AlF_6) is found in nature but there just isn't enough tonnage to satisfy its many uses. So, to fill the supply gap, cryolite is being synthesized from fluorspar. It is here that Sulphur enters the picture, for one of its widely used derivatives — Sulphuric Acid — is a key reaction agent.

Texas Gulf Sulphur Co.

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• MOSS BLUFF, TEXAS • WORLAND, WYOMING

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are quotations to mills, f.o.b. New York: per cwt.

No. 1 White Shirt Cuttings	14.50 to 15.50
New Unbleached Muslins	16.50 to 17.00
Fancy Shirt Cuttings	5.50 to 6.00
No. 1 Percales	6.50 to 7.00
No. 1 Washables	2.75 to 3.00
No. 1 Light Silesias	7.50 to 8.00
No. 1 Light Prints	5.25 to 5.75
Light Flannelettes	7.50 to 8.00
Cottonades	3.75 to 4.00
Blue Overalls	8.00 to 8.50
Blue Cheviots	8.00 to 8.50
Canton Flannels, Bleached	11.50 to 12.00
Canton Flannels, Unbleached	11.50 to 12.00
Osnaburg Cuttings	11.00 to 11.50
Underwear Cuttings, Bleached	15.50 to 16.50
Underwear Cuttings, Unbleached	15.50 to 16.50
Khaki Cuttings—	
Sun Tan	6.00 to 6.50
Mixed	3.75 to 4.00
Linen Cuttings—	
American	7.50 to 8.00
White	12.00 to 13.00
Grey	12.00 to 13.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

Roofing	Per cwt.
No. 1	1.45 to 1.55
No. 2	1.25 to 1.35
No. 3 and 4	.95 to 1.05
Twos and Blues—	
Repacked	2.75 to 3.00
Thirds and Blues—	
Repacked	2.50 to 2.75
Miscellaneous	2.15 to 2.35
Whites, No. 1—	
Repacked	4.25 to 4.50
Miscellaneous	3.50 to 3.75
Whites, No. 2—	
Repacked	3.25 to 3.50
Miscellaneous	2.75 to 3.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

per cwt.

Nominal:
- New Dark Cuttings
- New Mixed Cuttings
- New Light Silesias
- Light Flannelettes
- Unbleached Cuttings
- New White Cuttings
- New Light Oxfords
- New Light Prints

RAGS (Foreign)

ex dock New York City

OLD RAGS

per cwt.

Nominal:
- No. 1 White Linens
- No. 2 White Linens
- No. 3 White Linens
- No. 4 White Linens
- No. 1 White Cottons
- No. 2 White Cottons
- No. 3 White Cottons
- No. 4 White Cottons
- Extra Light Prints
- Ord. Light Prints
- Med. Light Prints
- Dutch Blue Cottons
- French Blue Cottons
- French Blue Linens
- Checks and Blues
- Linsey Garments
- Dark Cottons
- Old Shapperies

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.50 to 6.00
Domestic	5.50 to 6.00
Wool Tares—	
Light	5.50 to 6.00
Heavy	5.75 to 6.25
No. 1 Scrap Bagging	4.75 to 5.25
Manila Rope—	
No. 1 large, dom.	8.00 to 8.50
No. 1 small	7.00 to 7.50
Sisal Rope—	
No. 1 large	6.00 to 6.50
No. 1 small	5.50 to 6.00
New Burlap Cuttings	5.75 to 6.25
Jute Threads—	
Foreign (Nom.)	6.00 to 6.25
Domestic	6.25 to 6.50
Strings—	
No. 1 sisal	4.75 to 5.00
No. 2 sisal	4.25 to 4.50
Soft jute	4.75 to 5.00
Mixed	2.00 to 2.25

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts.	135.00 to 145.00
Hard White No. 1	110.00 to 115.00
Soft White, one-cut	95.00 to 100.00
Soft White, No. 1	80.00 to 85.00
Fly Leaf No. 1	45.00 to 50.00
Fly Leaf, Woody No. 1	45.00 to 50.00
No. 2 Mixed Col. Wood	35.00 to 40.00
Flat Stock—	
No. 1 Heavy Books and Magazines Repacked	38.00 to 40.00
Mixed Books	28.00 to 30.00
Ledger Stock—	
No. 1 White	65.00 to 70.00
No. 1 Mixed (Colored)	42.50 to 47.50
Manilas—	
New Env. Cuttings	85.00 to 90.00
New Cuts, One-Cut— Extra Manilas	21.00 to 22.00
Manila Tab Cards, Free of Ground Wood	90.00 to 95.00
Colored Tab Cards	70.00 to 75.00
Kraft—	
New Envelope Cuttings	85.00 to 90.00
Tripled Buried No. 1 100%	45.00 to 50.00
No. 1 Old Assorted	32.50 to 37.50
News—	
White Blank	85.00 to 90.00
Overissue	29.00—
No. 1 Folded	23.00—
Old Corrugated Containers	26.00—
New Jute Corrugated Cuts	31.00—
Mill Wrappers	24.00—
Box Board Chips	16.00—
No. 1 Mixed Paper	14.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	5.05—
Ground, cwt.	4.30—
Powdered, cwt.	5.20—
Blanc Fixe—	
Pulp, bulk, ton	110.00—
Dry, barrels	115.00—
Bleaching Powder—	
Drums, cwt	5.02 to 6.50
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	31.00 to 32.00
Argentine, lb.	24.00 to 25.00
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 19.00
Domestic Coating Bulk (mine) ton	17.00 to 25.00
Imported (ship side) Bulk (lump) ton	20.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	3.05—
Gelatine (silicon), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.30½ to .31
Litharge, Powd. bbl.	.17½ to .18
Rosin (Gum)—	New York, per 100 lbs.
E	9.40—
F	9.40—
G	9.40—
WW	9.65—
Rosin (Wood), carlots, F.O.B. South	6.50—
Salt Cake—	
Dom. bulk (wks) ton	28.00 to 29.00
Imp. bulks on dock— (Atl. ports) ton	
(Nom.)	22.00—
Soda Ash—	
Bulk (works) cwt.	1.45 to 1.50
Paper bags, cwt.	1.80—
Soda (Caustic)—	
Solid, drums, cwt.	4.10 to 4.85
Ground and flake, drums, cwt.	4.50 to 5.25
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.60 to 1.70
40 deg. 35 gal. drums, (works), cwt.	1.35 to 1.40
Starch—	
Pearl, 140 lb. bags, cwt.	6.39—
Pearl, barrels, cwt.	6.39—
Paper (Sq.) bags, cwt.	6.39—
Powdered, barrels, cwt.	6.60—
Sulphur (Crude)	
(Mine) bulk, long ton	26.50 to 28.00
Talc—	
Dom. 100 lb. bags (mine) ton	26.00 to 30.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig. bbls., lb.	.24½ to .26½
Calcium Pig, bbls., lb.	.24½ to .26½
Zinc Oxide, bags	14.50 to 15.50

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

Bleached Sulphite	150.00—
Bleached Sulphite, Canadian	150.00—
Unbleached Sulphite	130.00—
Unbleached Sulphite, Canadian	130.00—
Bleached Soda	145.00—
Bleached Soda, Canadian	145.00—
Kraft Bleached	152.00 to 155.00
Kraft, Bleach., Hardwood	150.00—
Kraft, Bleach., Southern	155.00—
Kraft, Bleach., Canadian	155.00—
Kraft, Unbleached, Northern	130.00—
Kraft, Unbleached, Southern	117.50 to 122.50
Kraft, Unbleached, Canadian	120.00 to 130.00
Kraft, Semi-Bleached, Southern	140.00—
Sulphite Screenings	72.50—
Sulphate Screenings	67.50—
Groundwood	80.00 to 85.00

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish, freight allowed	150.00—
Bleached Sulphite, Norwegian, freight allowed	145.00—
Bleached Sulphite, Finnish, freight allowed	150.00—
Unbleached Sulphite, Swedish, freight allowed	130.00—
Unbleached Sulphite, Finnish, freight allowed	130.00—
Kraft, Unbleached, Swedish, freight allowed	125.00—
Kraft, Unbleached, Finnish, freight allowed	125.00 to 150.00
Kraft, Bleached, Swedish, on dock	155.00—
Kraft, Bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations New York City

Boards—

Prices per ton, delivered in New York, 10 tons or more:

Plain chip	100.00—
News vat lined chip	105.00—
.009 chip, rolls	100.00—
Filled news	100.00—
Solid news	105.00—
White vat lined chip	135.00—
Chip tube and can stock	120.00—
Single manila lined chip	150.00—
Single jute lined chip	135.00—
Container, 42 lb.	127.50—
Kraft liner	130.00 to 140.00

White patent coated:

.020	175.00—
.018	177.50—
.016	180.00—

Book Paper f.o.b. New York— per cwt.

Machine coated, two sides

70 lb. No. 2 enamel; 25 x 4 cases $17.75
38-500, trimmed 4 sides. Carloads $16.80
45 lb. enamel, 25x38-500, 4 cases $13.55
trimmed 4 sides ..... Carloads $12.60

Uncoated

55 lb. No. 2 offset, 25x38 4 cases $15.30
500, trimmed 4 sides .... Carloads $14.35
50 lb. A Grade English Finish, 25x38-500, un 4 cases $14.55
trimmed ..... Carloads $13.60
20 lb. envelope, 17x22-500, untrimmed ..... Carloads $12.90
16 lb. tablet, 17x22-500 ..... Carloads $11.85

Rag Content Bond—
(White, 5,000 to 10,000 lbs., basis 16 lb.)

100% rag	59.80—
75% rag	45.45—
50% rag	36.20—
25% rag	29.70—

Rag Content Ledger—
(White, 5,000 to 10,000 lbs.)

100% rag	59.80—
75% rag	45.45—
50% rag	36.20—
25% rag	29.70—

Sulphite Bond—
(White, 5,000 to 10,000 lbs., basis 16 lb.)

No. 1	21.00—
No. 2	20.75—
No. 4	18.25—

Sulphite Ledger—
(White, 5,000 to 10,000 lbs.)

No. 1	21.50—
No. 2	20.50—
No. 4	19.00—

News delivered in New York— per ton

Rolls, Standard (Contract)	129.00 to 132.00
Rolls (Spot)	(Nominal)
Sheets	140.00—

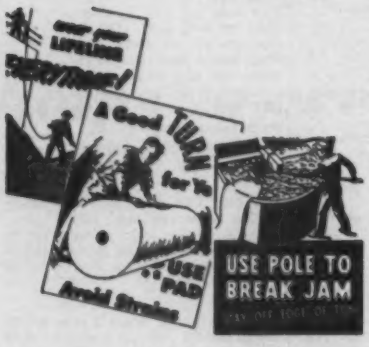
Tissues (Carlots) f.o.b. New York—

	per ream
White No. 1	2.10—
White No. 2	1.70—
Bleached Anti-Tarnish	2.30—
Colored	2.10—
Anti-Tarnish Kraft	1.75—
Manila	2.10—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	1.00—
Napkins, full crepe and embossed (12½ lb. to Mshts.) per cs.	1.00—
Toilet, Bleached (M shts.) per cs.	9.50—
Toilet, Unbleached (M shts.) per cs.	8.00—

Wrappings (Kraft) f.o.b. New York— (Basis 50 lb. & heavier) per cwt.

Standard wrapping	8.50—
Butchers, counter rolls	8.75—
Standard bag, mill rolls	8.00—
Shipping sack, mill rolls	8.25—
Gumming, mill rolls	8.50—
Asphalting, mill rolls	8.25—
Envelope, mill rolls	9.75—

POSTERS — A POTENT SAFETY TOOL



Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program... the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in three sizes: "A" size, 8½" x 11½"; "B" size, 17x23"; and "C" size, 25x38". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

425 N. Michigan Ave.
Chicago 11, Illinois

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You'll find the following interesting Book Review on page 159A, January, 1956 issue of Tappi---

Paper and Paperboard Making. By Harry Williamson, Consulting Engineer. Fritz Publications, 431 S. Dearborn St., Chicago. Buckram, 5 × 7½, 371 pages. $6.00.

The author is well known to the paper industry. Many readers of *Tappi* have read Mr. Williamson's articles published serially in *The Paper Industry*. He has on several occasions given talks at meetings of the Technical Association. His presence for this purpose has always drawn very large audiences.

It is difficult to review a book by the author. A short review is inadequate and to attempt to do justice to such a book it is difficult to know when to stop. Mr. Williamson has drawn upon his own experience covering many years of practical papermaking The book has to be read to be appreciated. In fact, it should be read aloud in the presence of a group of papermakers. In doing so the reader should be ready to be interrupted since the subject matter by its nature is controversial and other papermakers would want to comment in his own way on each paragraph and chapter. This procedure is known as "making paper" and is a feature of every papermaking convention.

Without attempting to analyze the text we will limit our review to a statement of the book's coverage—wood fibers, hydration, beating practice, white-water systems, the multiple cylinder machine, cylinder mold formation, vats effect of turbulence, baffleboards, the fourdrinier machine, formation, slices, the pond area, table rolls, drainage, wire mesh, suction boxes, vacuum pumps, etc. It is a short book but will require much time for the reader since Mr. Williamson will make him think about many things which will delay completion of reading for considerable time. The relative brevity is very deceiving. More papermakers should be writers. There is much to be written.

Send for your copy today. Use this handy order form--

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PAPER INDUSTRY

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1956-58 newsprint expansion

The 1956-58 newsprint expansion program, estimated at $350,000,000, will add 1,954,241 tons of new annual capacity to the North American newsprint industry, bringing total production capacity to 9,427,730 tons.

Canadian newsprint capacity will be increased by 1,178,241 tons to a total of 7,242,730 tons; while U. S. capacity will rise by 776,000 tons to a total of 2,185,000 tons.

Will this two-year expansion program ease the currently tight newsprint situation? The answer depends on the general business outlook. Should there be a general leveling off of business activity, the proposed newsprint expansion program would seem quite adequate; on the other hand, should business activity continue at the present rate, it is very probable that added newsprint capacity will be needed by 1960.

Vacuum-forming

With the large air-handling capacity of modern vacuum pumps, it would seem logical to expect an acceleration of effort toward the development of an efficient paper machine that will depend on the use of vacuum in the forming area.

Ultrasonics in papermaking

Ultrasonic equipment operating at a frequency of 12,000 kc per second has been tested in an Austrian paper mill with the following results: This single piece of equipment was found to do the work of three Hollanders while using only 33 per cent of the power requirement and 17 per cent of the floor space. The quality of the paper was improved by the ultrasonic treatment of stock to the extent that the paper obtained was softer, more absorbent, bulkier and stronger than that of conventionally produced grades.

A French patent describes the use of ultrasonics in better water removal at the couch.

Synthetic latexes as beater additives

The addition of latex to the pulp has an advantage over latex impregnation of paper in that it permits the formation of a greater number of bonds between the resin molecules and the fibers.

For improved wet strength, pliability and resistance to chemicals, the addition of Neoprene in small quantities up to 5 per cent was found to give the most desirable results; while for larger additions (up to 100 per cent), to achieve high tearing strength and resilience, styrene butadiene latex and butadiene acryl nitrile were found to be quite satisfactory.

If the advantages of using DARLING'S GLUE for improving retention haven't as yet gained *your* attention, we believe you'll find them well worth considering. The benefits derived from using a DARLING GLUE solution as a wet end additive vary with mill conditions. Generally speaking, here is what to expect—

—a significant increase in percentage of filler retained
—a more uniform sheet . . . in terms of opacity, basis weight and ash content
—a reduced load to the saveall

We'd like to work with you in determining what can be accomplished in your mill. The cost is on us, so you've nothing to lose . . . plenty to gain. You can make arrangements through your DARLING sales representative. Or write or call us direct.

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Armstrong Syphon Scoop

provides Superior Dryer Drainage at any Speed

Better Heat Transfer . . .
Less Horsepower . . .
Fewer Repairs

In a 3-hour test on a 60" diameter, 168" face kraft paper dryer operating at 720 fpm, an Armstrong Syphon Scoop removed 110 gallons of condensate, while a stationary syphon removed only 25 gallons from an adjacent dryer closer to the wet end.

Obviously the 85 gallons of condensate remaining in the poorly drained dryer had no beneficial effect on heat transfer and greatly increased the horsepower to drive it. Cascading water in dryers is also a common source of breakage of stationary syphon pipes.

This field test confirms observations made in an open end test dryer in the Armstrong laboratory, as shown in the table below.

PERFORMANCE COMPARISON—Dryer Drainage Devices*			
	Slow Speed up to 500 fpm	Medium Speed up to 900 fpm	High Speed over 900 fpm
Stationary Syphon	GOOD	POOR	POOR
Spiral Revolving Scoop	GOOD	POOR	POOR
Revolving Syphon	POOR	FAIR	POOR
Armstrong Syphon Scoop	GOOD	GOOD	GOOD

**NOTE: Speeds shown are approximate and results would vary depending on dryer and rate of condensation.*

Ordinary drainage devices permit a rim of water to build up to a depth of as much as ½" around the inside of a dryer shell. With an Armstrong Syphon Scoop the rim of condensate cannot exceed 1/16" in depth. And, at speeds below rimming, the generous scoop removes condensate as fast as it accumulates in the bottom of the dryer. As a result, heat transfer is not impaired, horsepower requirements are reduced and there is no maintenance problem.

For complete information on how to improve dryer drainage, write to Armstrong today.

NEW . . . BULLETIN FREE ON REQUEST

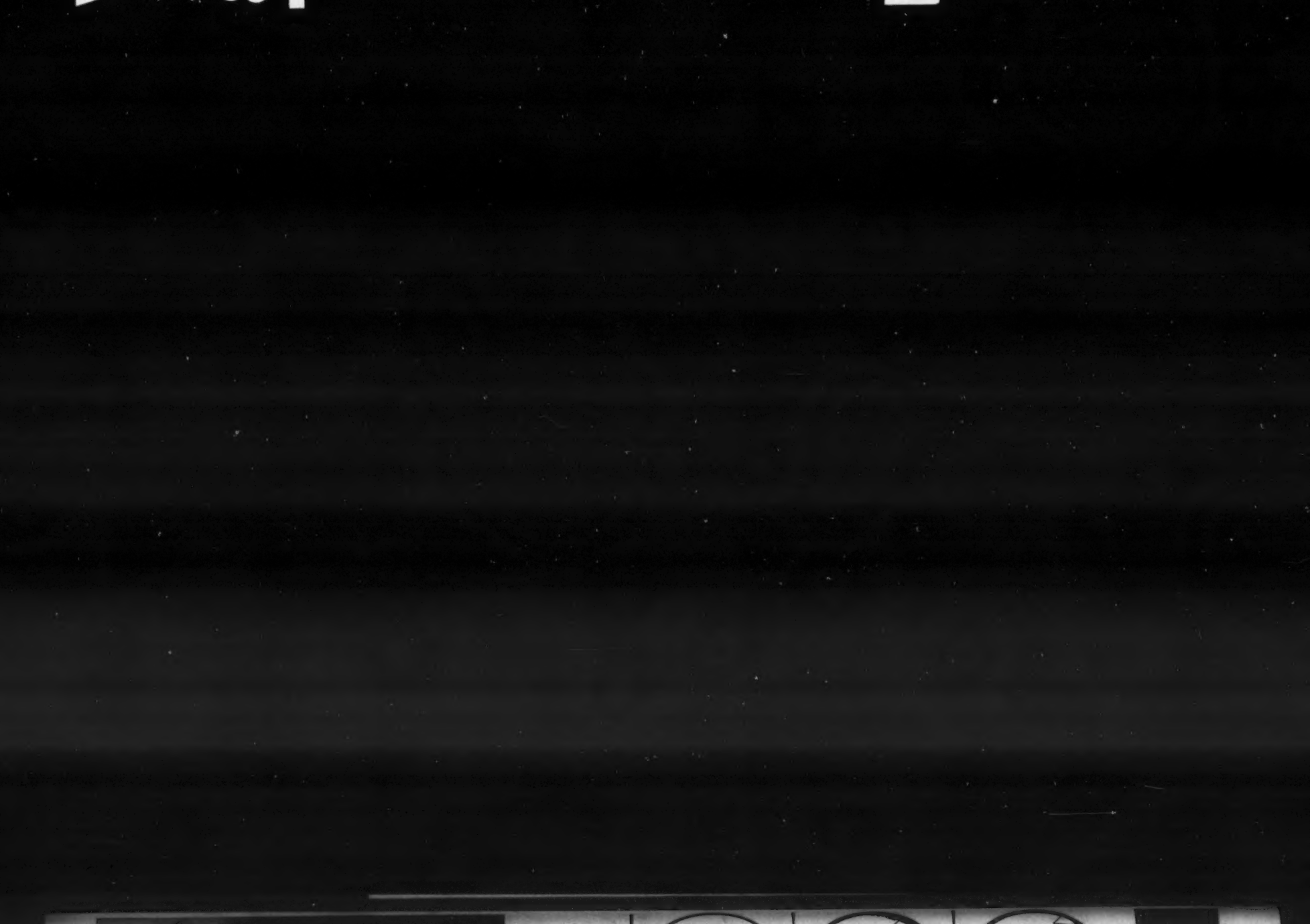
Bulletin No. 350 gives complete details of the Armstrong Syphon Scoop, describes performance on test dryer, gives physical dimensions and capacities, describes principle of operation and contains list of satisfied users. Send for yours today.

● View of Armstrong Revolving Syphon Scoop in open test dryer at Armstrong Laboratory. Photo taken at 1/1000 second. Water is supplied to dryer through pipe shown. Performance of Syphon Scoop can be observed at all speeds.

Drawing at left shows correct proportion of Syphon Scoop to 5 ft. dryer.

● **SLOW**—view into test dryer operating at 240 fpm with Armstrong Syphon Scoop, starting with pool of water at bottom. Water input rate is 2370 lbs. per hour. In operation, the Syphon Scoop removes water as fast as it enters test dryer.

● **FASTER**—Speed of the dryer has carried the water up the side, but the Syphon Scoop works just as effectively as if the water were at the bottom. There is no build-up of water load to cause costly increase in drive horsepower required.

● **FASTEST**—water has rimmed completely around inside of dryer. This "skin" of water will never exceed 1/16" thickness because there is a 1/16" restriction between the Syphon Scoop and the dryer shell.

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